

Test Monitoring Center

https://www.astmtmc.org

ASTM D02.B.03 Semiannual Report Gear Reference Oil Testing

October 2025

Table of Contents

Section	Topic
Executive Summary	
	<u>Summary Items</u>
	Calibrated Labs and Stands
Test Area Status Summaries	
	<u>L-33-1</u>
	<u>L-37-1</u>
	<u>L-42</u>
	<u>L-60-1</u>
	<u>OSCT</u>
	<u>HTCT</u>
	<u>L-37 RC</u>
	<u>L-42 RC</u>



Table of Contents

Section	Topic
Additional Information	
	<u>Information Letters</u>
	Reference Oil Inventory
	<u>LTMS Deviations</u>
	TMC Laboratory Visits
	Test Area Time Lines
	Rating Workshop Data
	Misc. Information



Gear Oil Testing Executive Summary

- Several reference oils are in the process of being updated to replace older reference oils
 - Approval testing underway for OSCT

Request to panel members to provide reference oil replacement for 117



Gear Oil Testing Executive Summary

OSCT:

- Reference oil 171-1 was introduced in August 2025. This is a reblend of oil 171 used for PA and FL elastomer testing.
- Approval matrix testing still underway for reference oils 172 and 170-1.



Calibrated Labs and Stands*

Test	Labs	Stands
L-33-1	3	7
L-37-1	4	4
L-42	4	4
L-60-1	4	12
OSCT	2	5
HTCT	1	0



^{*}As of 09/30/2025

L-33-1



OCTOBER 2025



L-33-1 Test Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	7
Unacceptable Calibration Test	OC	0
Operationally Invalid Calibration Test (TMC and lab judgement)	LC	1
Aborted Calibration Test	XC	1
Acceptable Hardware Approval Run	NI	3
Unacceptable Hardware Approval Run	MI	1
Total		13



L-33-1 Failed Tests

Test Status	Validity Code	#
Unacceptable Calibration Test (Mild Rust)	OC	0
Unacceptable Calibration Test (Precision)	OC	0
Unacceptable Calibration Test (Severe Rust)	OC	0
Total		0



L-33-1 Lost Tests

Test Status	Validity Code	#
Oil temp out of spec	LC	1
Software glitch during motoring phase	XC	1
Oil temp out of spec	MI	1
Total		3



L-33-1 Test Severity

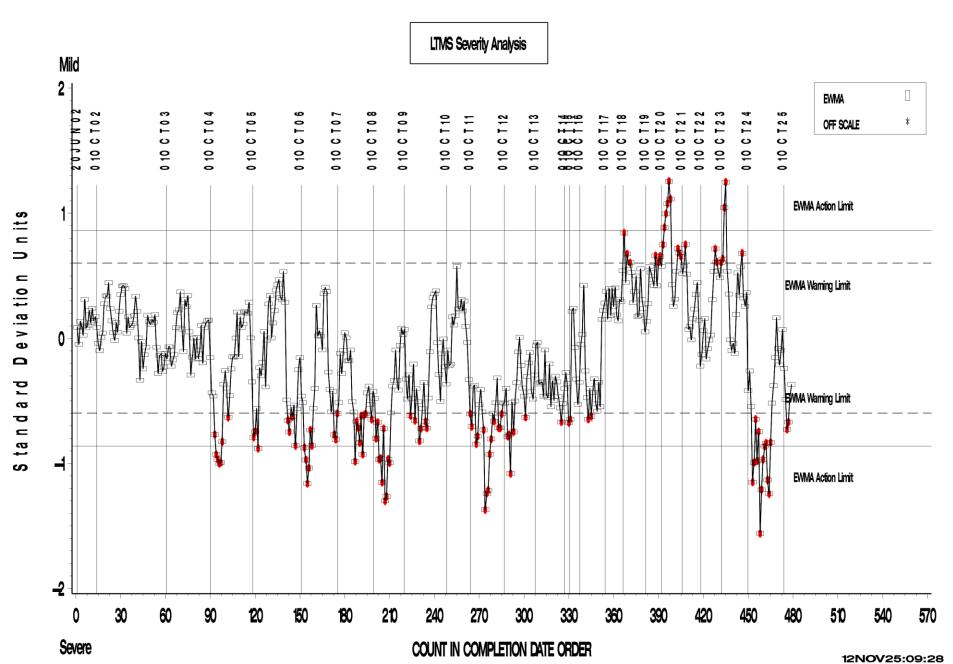
- Rust industry severity had two tests outside of the warning limit in the severe direction this reporting period but finished within limits.
- Rust industry precision remained within the limits this period.



L-33-1 INDUSTRY OPERATIONALLY VALID DATA



FINAL RUST RESULT

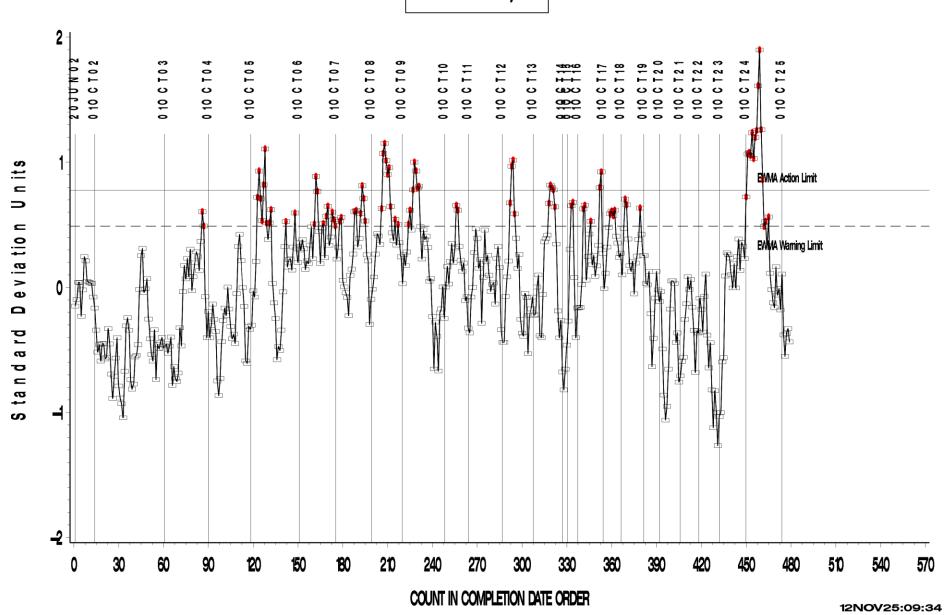


L-33-1 INDUSTRY OPERATIONALLY VALID DATA



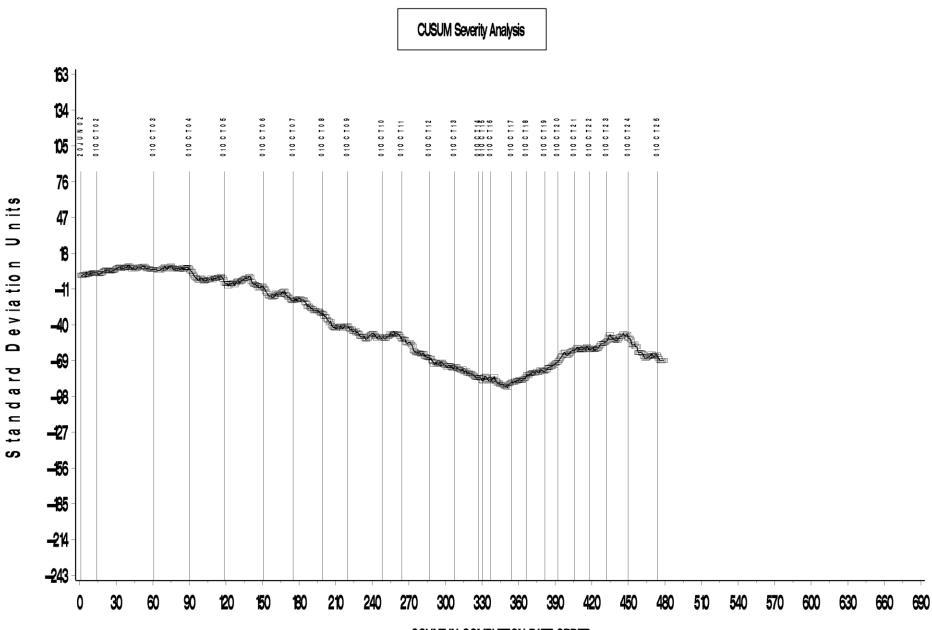
FINAL RUST RESULT





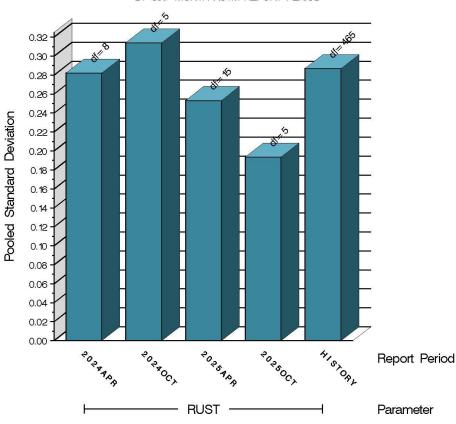


FINAL RUST RESULT



L-33-1 Precision Estimates





9:16:26 12NOV2025



L-37-1



October 2025



L-37-1 Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	6
Unacceptable Calibration Test	OC	0
Acceptable Information Run	NI	8
Aborted Information Run	XI	1
Total		15



L-37-1 Failed Tests

Test Status	Validity Code	#
No failed tests this reporting period	OC	0
Total		0



L-37-1 Lost Tests

Test Status	Validity Code	#
Aborted due to broken teeth	ΧI	1
Total		1



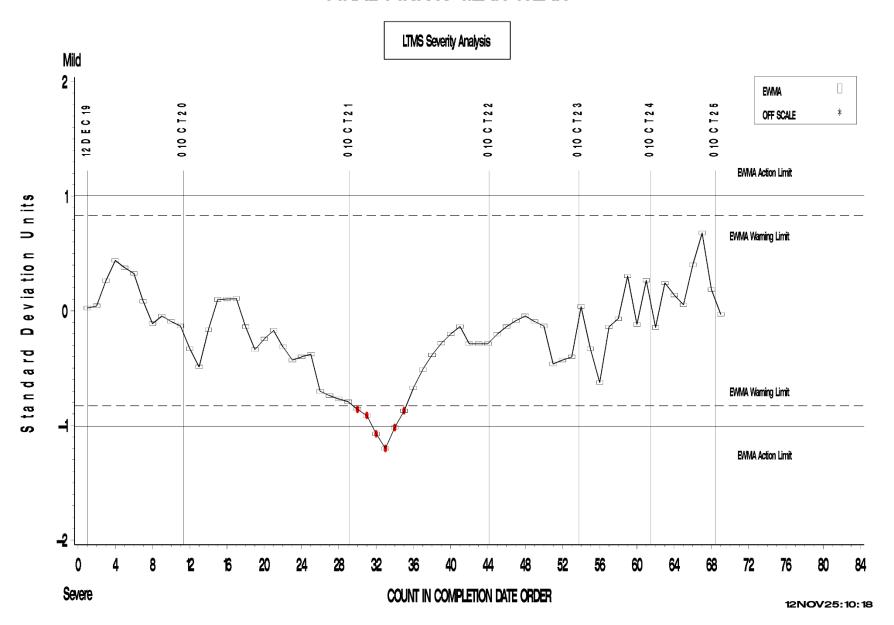
L-37-1 Test Severity Summary

- Uncoated Hardware:
 - All parameters remained within the limits this period for both precision and severity

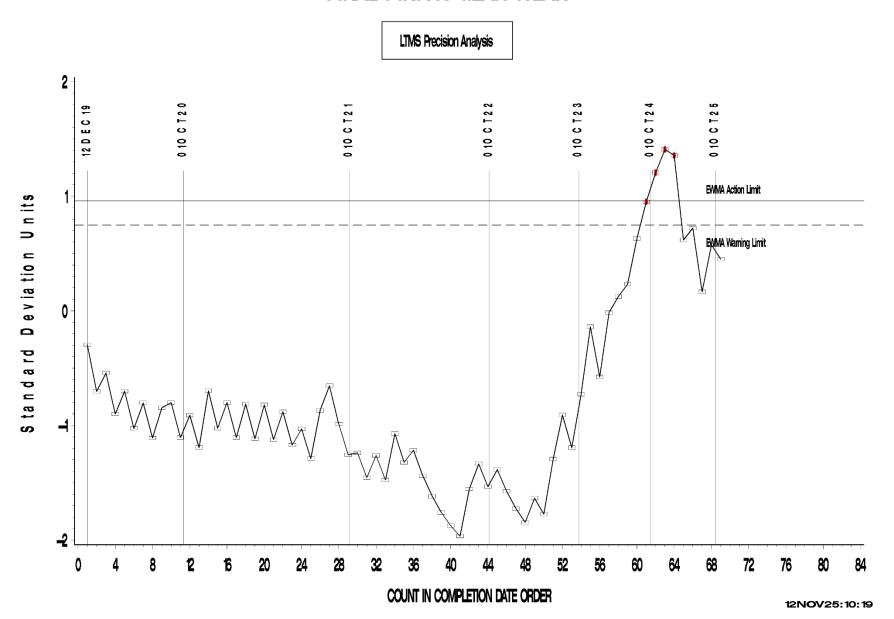
- Coated Hardware:
 - All parameters remained within the limits for severity during this reporting period.



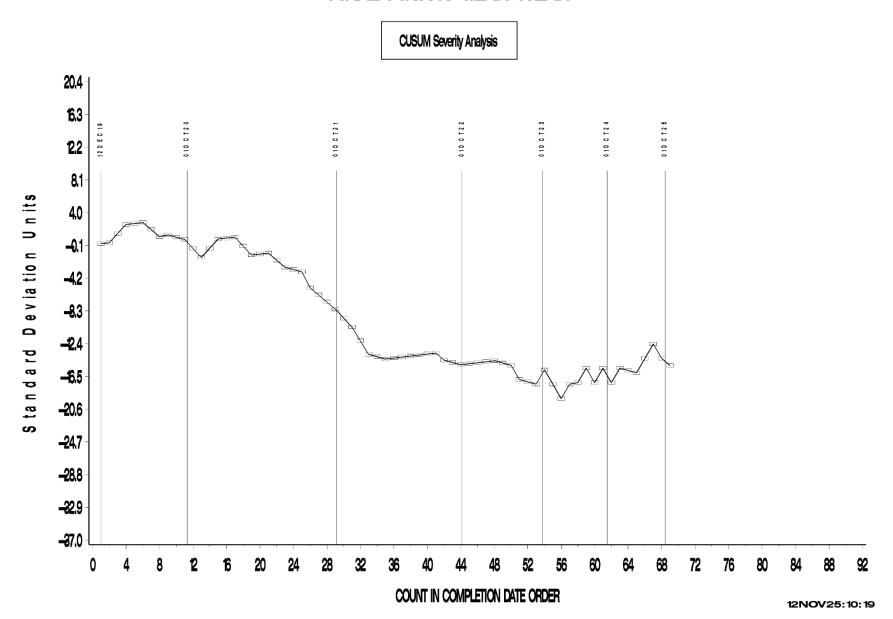




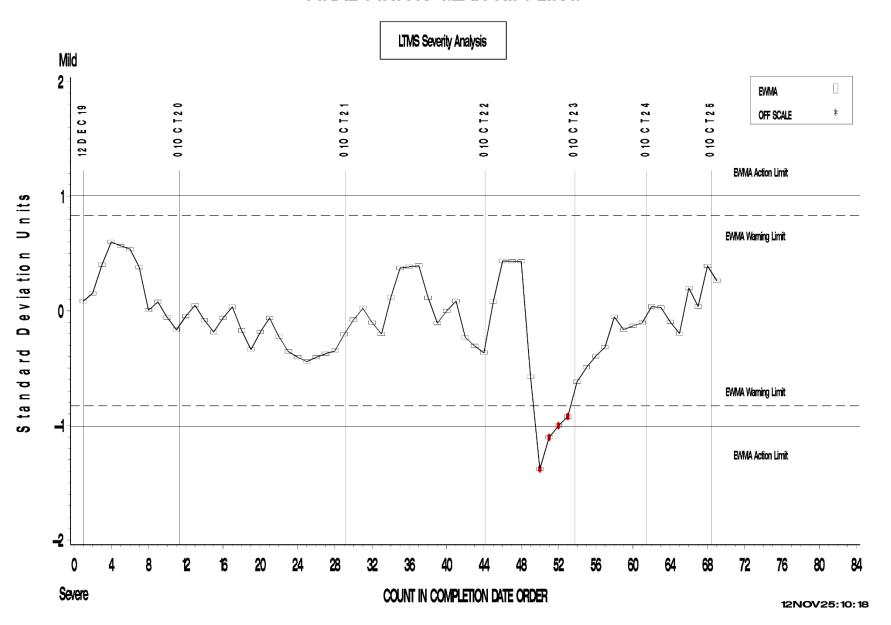




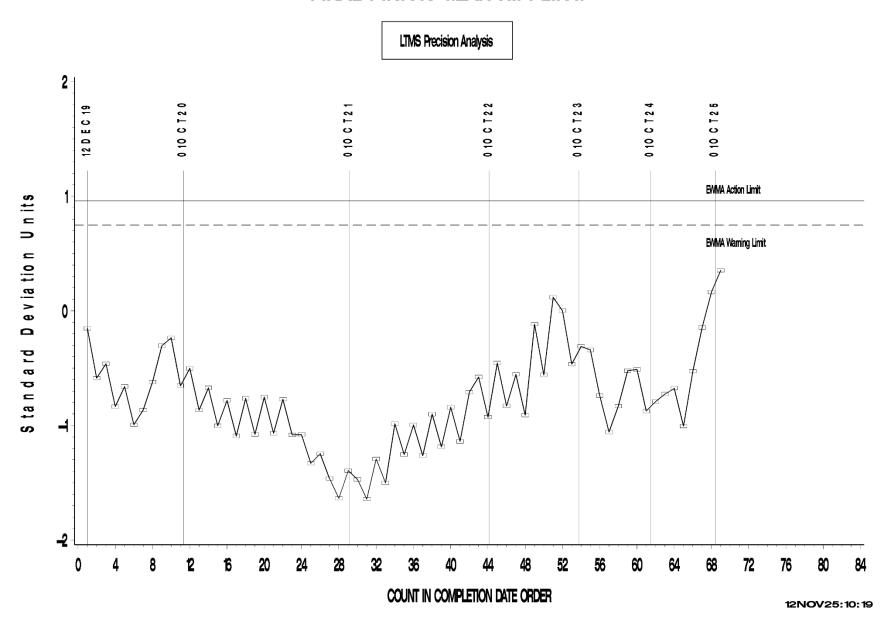




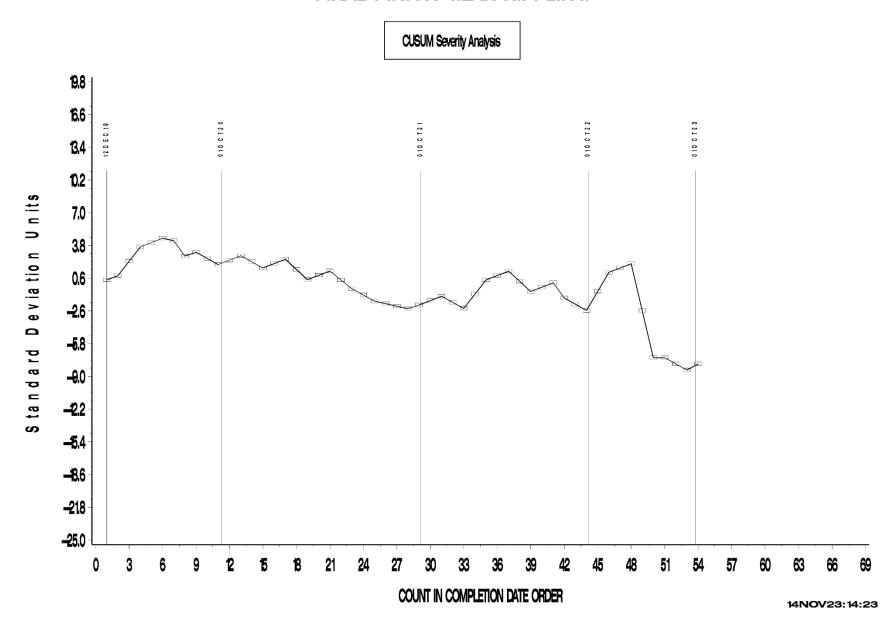




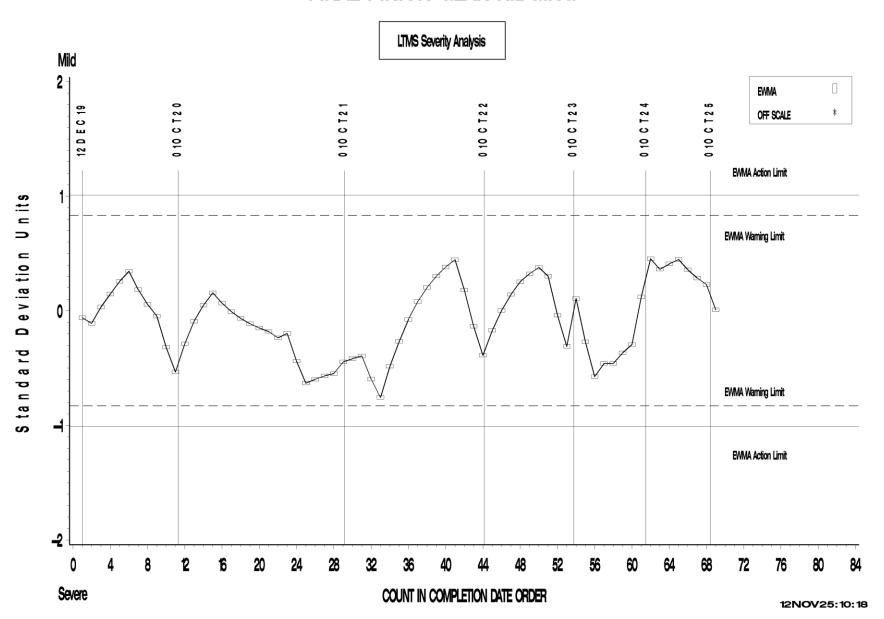




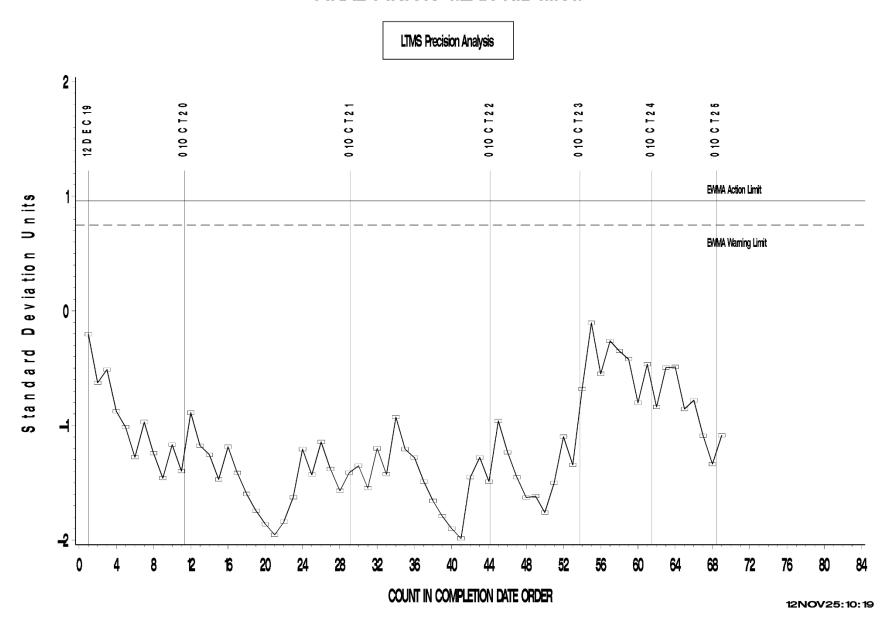




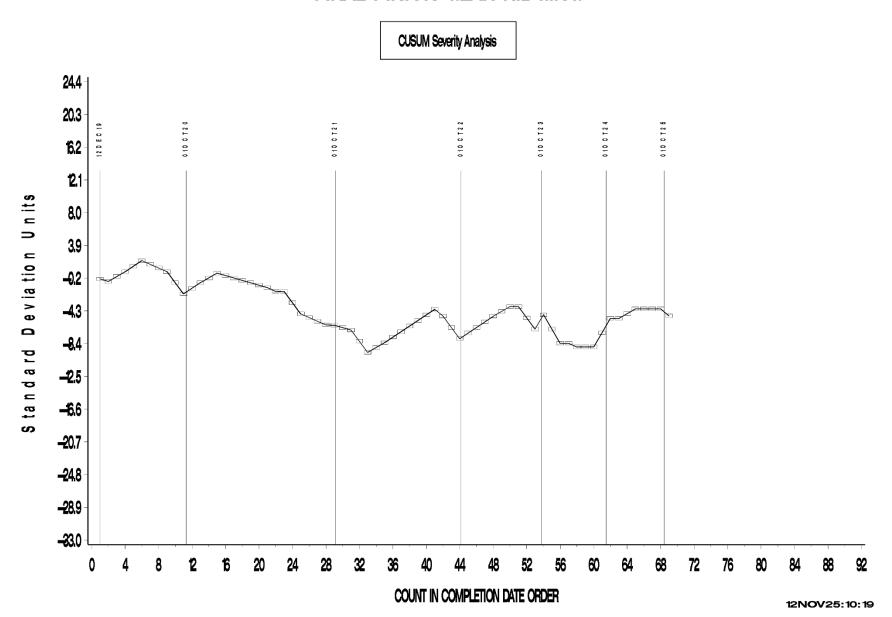






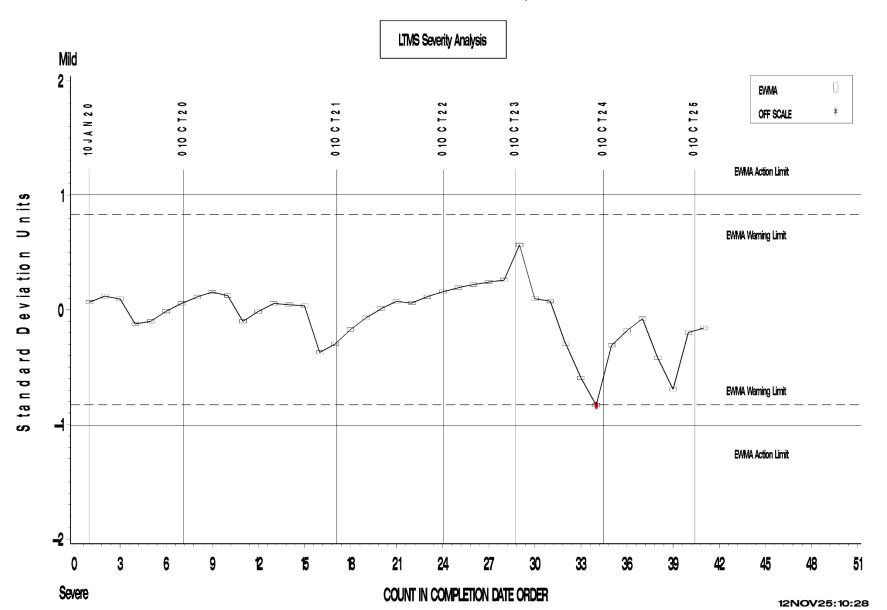






L -37 -1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA IND not in ('155 -1', '155 -2') FINAL PINION GEAR PITTING/SPALLING

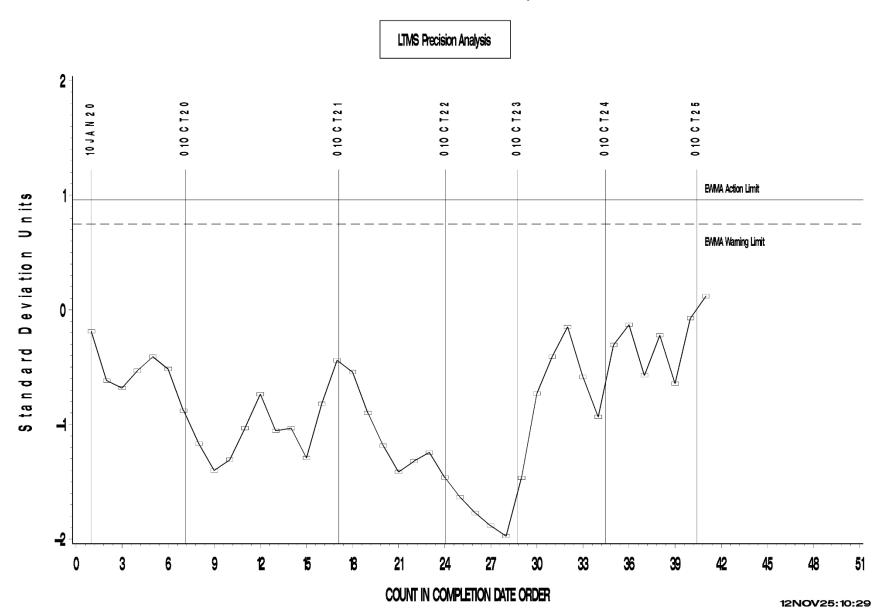




Results for 155-1/155-2 are not included in this SPIT chart due to its current targets yielding undefined calculations

L -37 -1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA IND not in ('155 -1', '155 -2') FINAL PINION GEAR PITTING/SPALLING

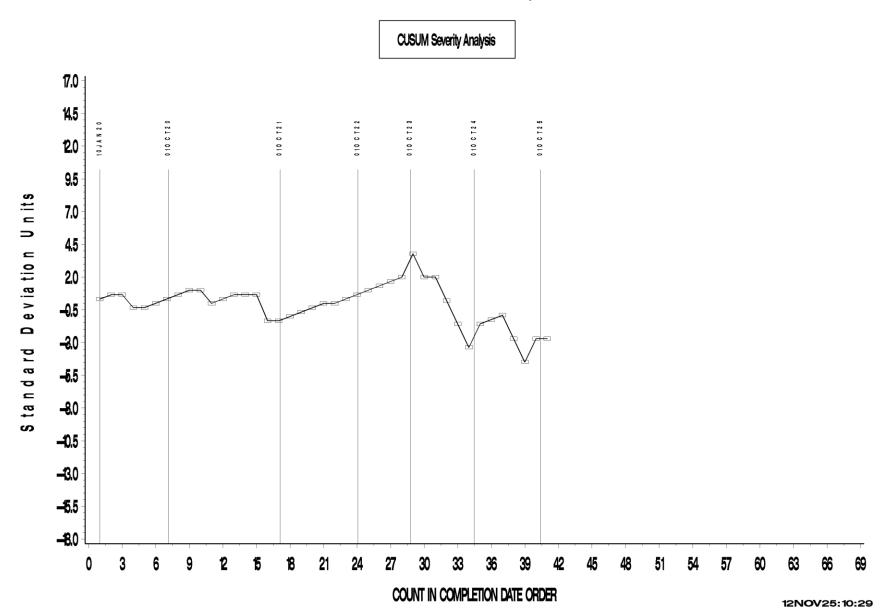




Results for 155-1/155-2 are not included in this SPIT chart due to its current targets yielding undefined calculations

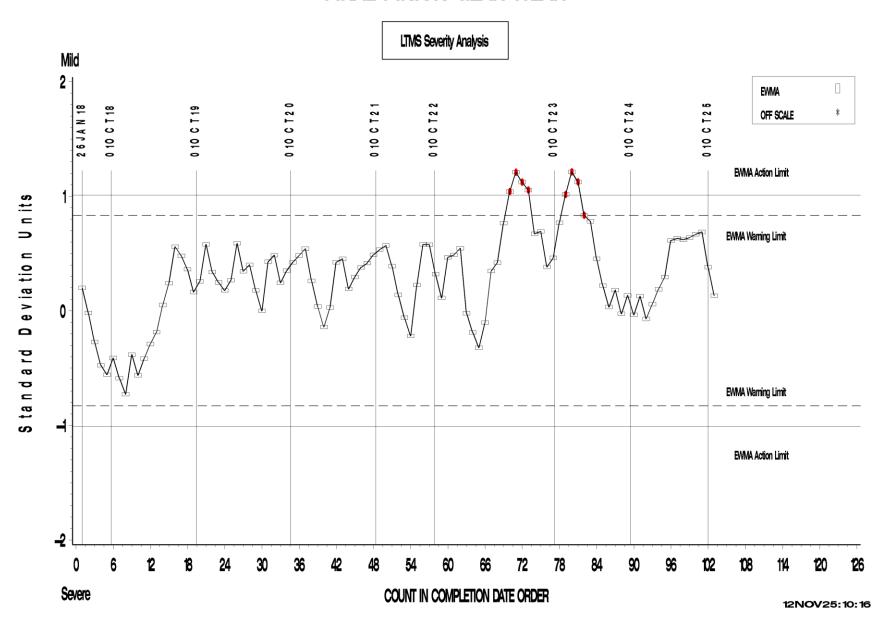
L-37-1 MNP COATED INDUSTRY OPERATIONALLY VALID DATA IND not in ('155-1', '155-2') FINAL PINION GEAR PITTING/SPALLING



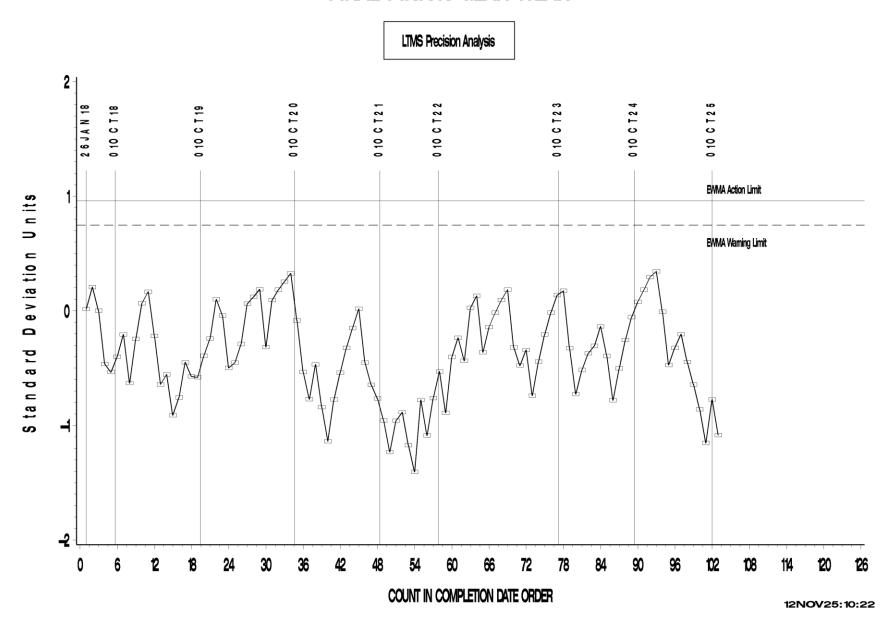


Results for 155-1/155-2 are not included in this SPIT chart due to its current targets yielding undefined calculations

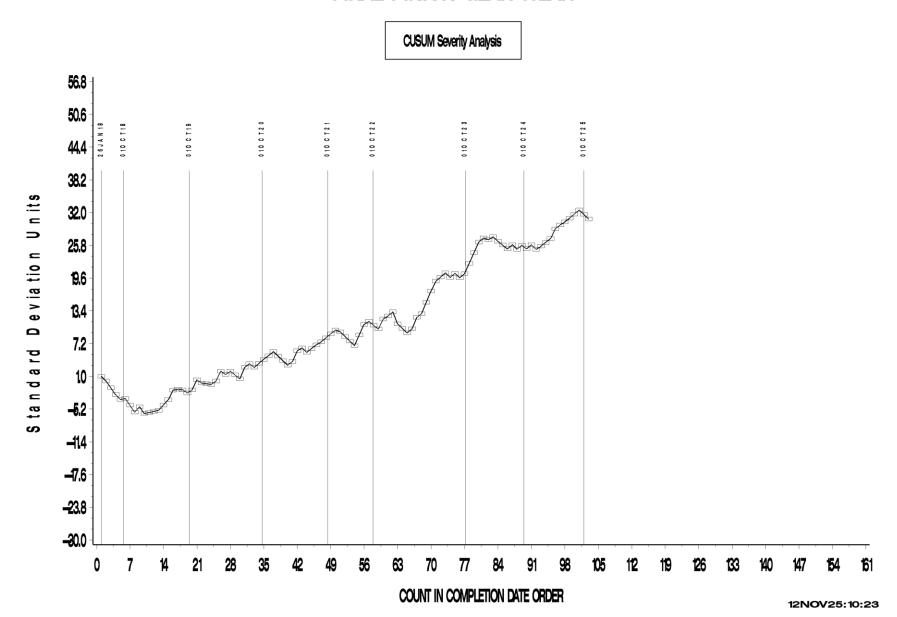




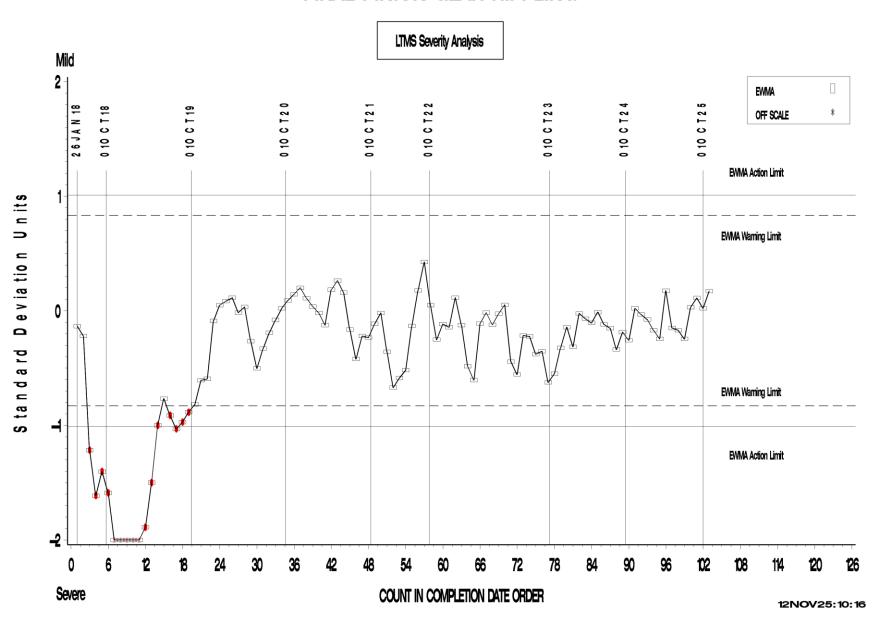






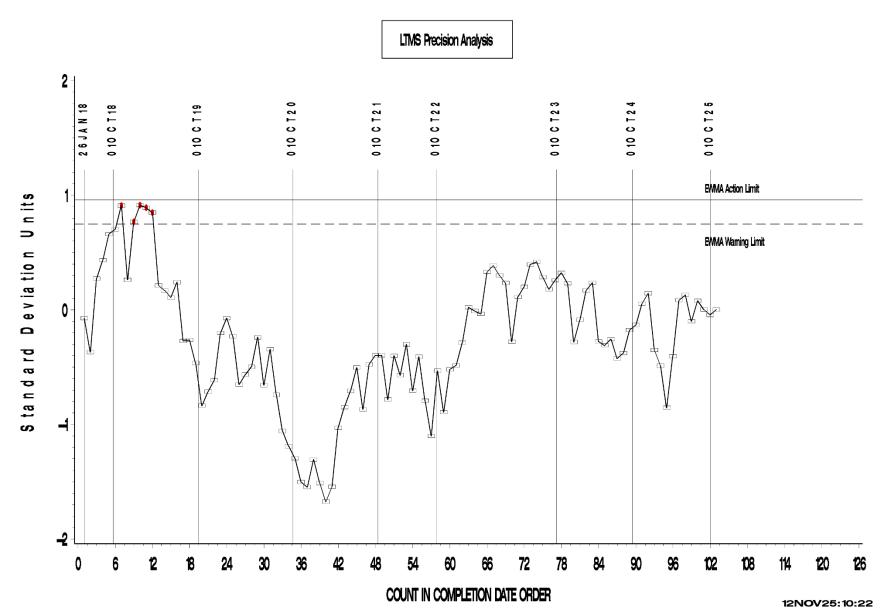






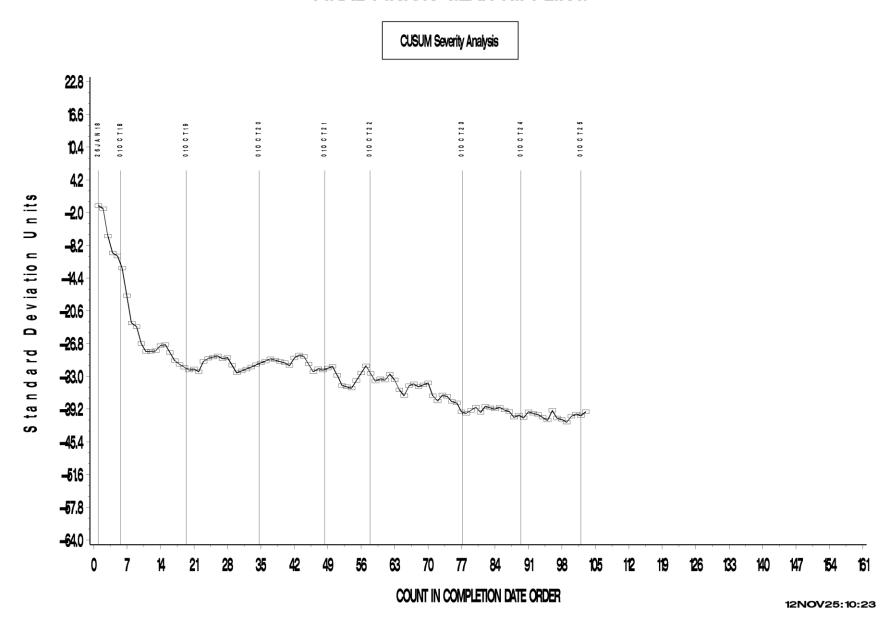


FINAL PINION GEAR RIPPLING



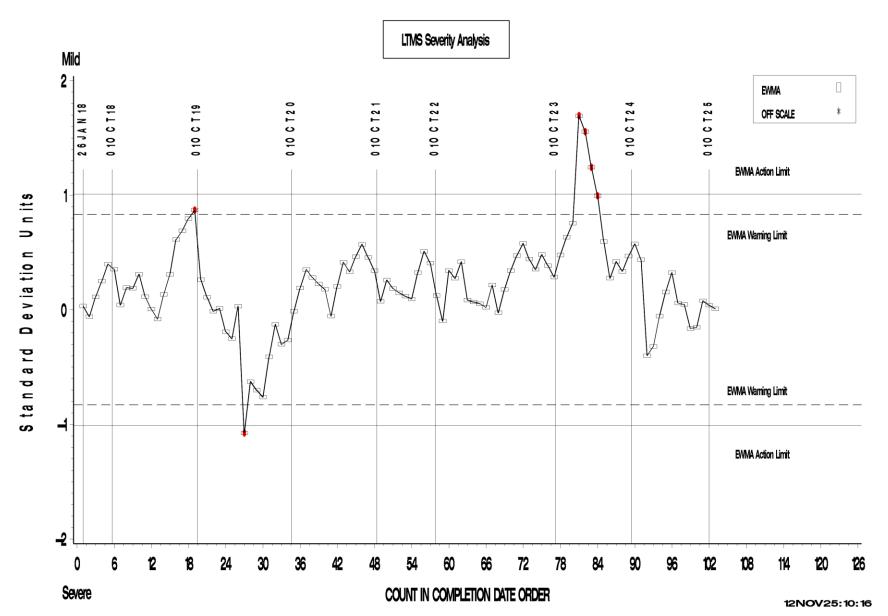


FINAL PINION GEAR RIPPLING



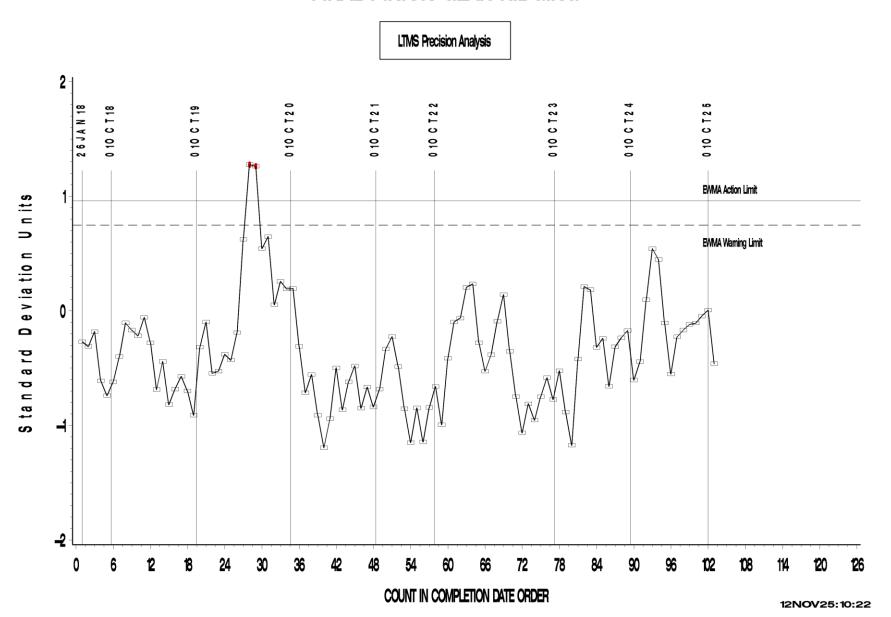


FINAL PINION GEAR RIDGING



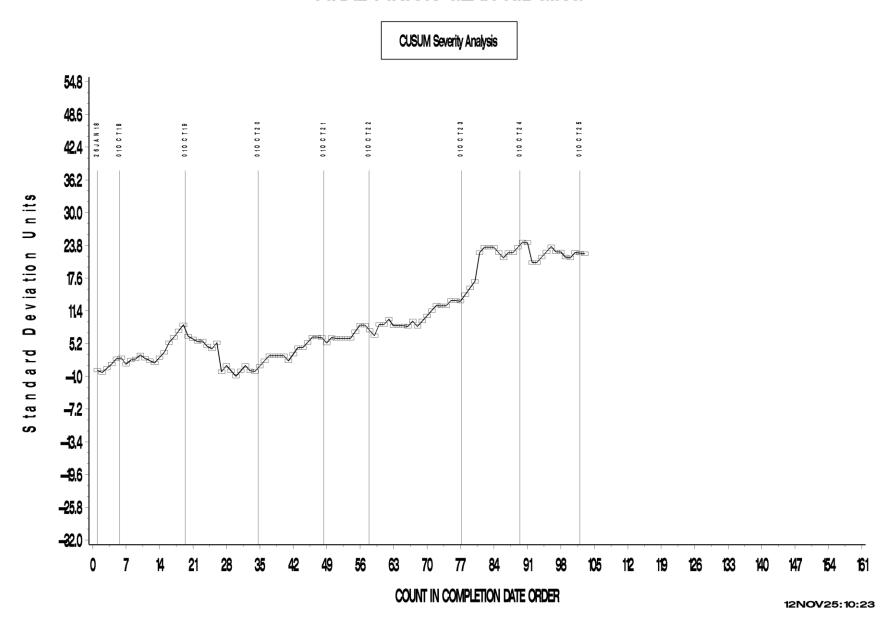


FINAL PINION GEAR RIDGING



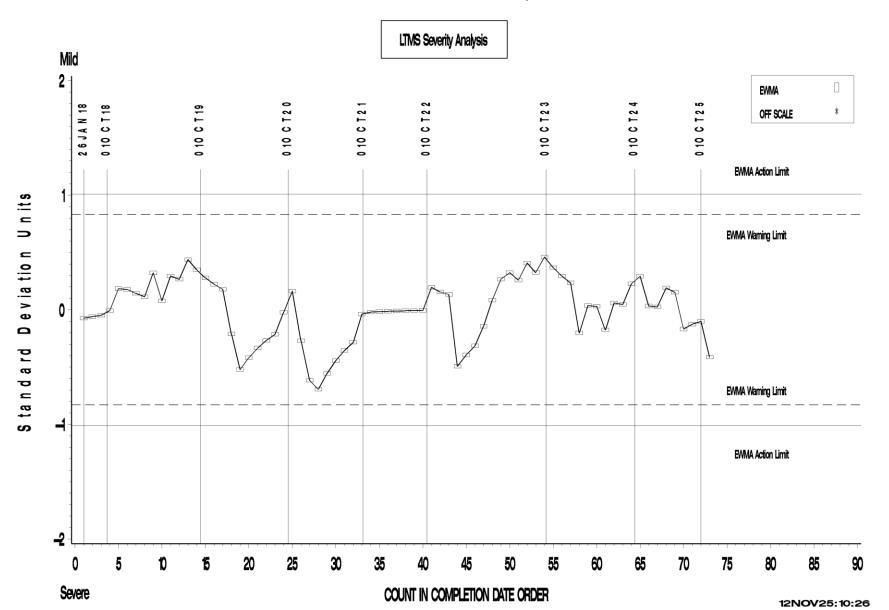


FINAL PINION GEAR RIDGING



L → 37 → UNCOATED INDUSTRY OPERATIONALLY VALID DATA IND not in ('155 → 1', '155 → 2') FINAL PINION GEAR PITTING/SPALLING

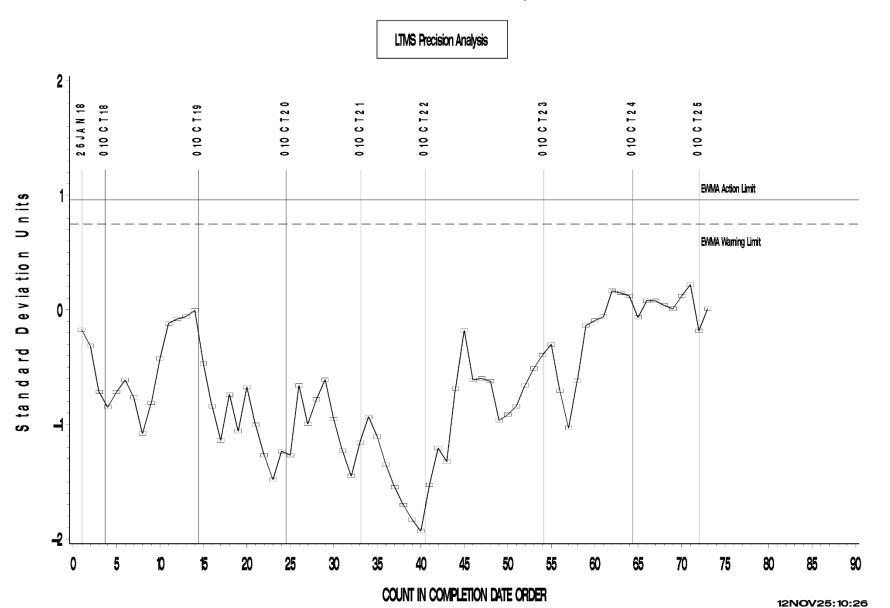




Results for 155-1/155-2 are not included in this SPIT chart due to its current targets yielding undefined calculations

L → 37 → UNCOATED INDUSTRY OPERATIONALLY VALID DATA IND not in ('155 → 1', '155 → 2') FINAL PINION GEAR PITTING/SPALLING

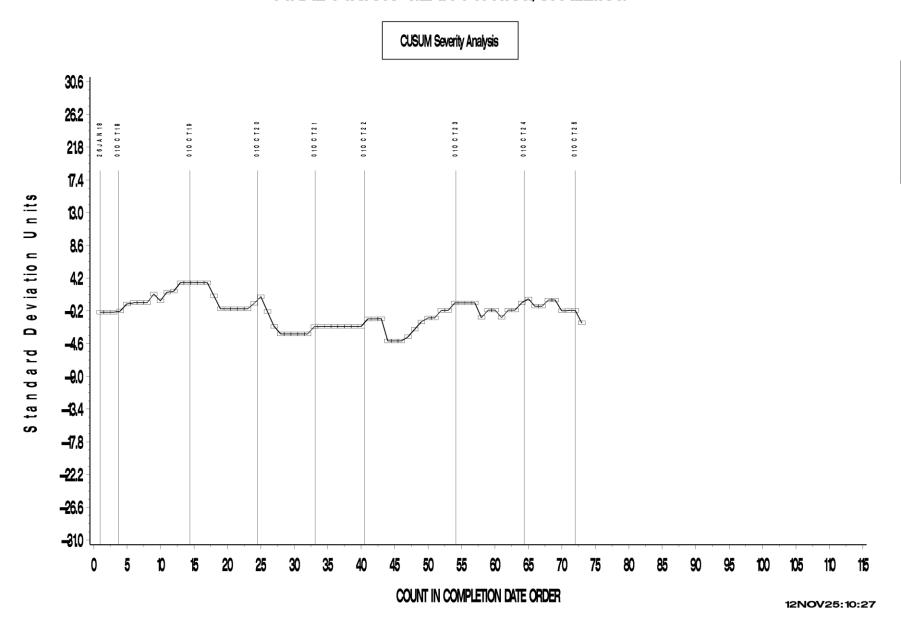




Results for 155-1/155-2 are not included in this SPIT chart due to its current targets yielding undefined calculations

L → 37 → UNCOATED INDUSTRY OPERATIONALLY VALID DATA IND not in ('155 → 1', '155 → 2') FINAL PINION GEAR PITTING/SPALLING

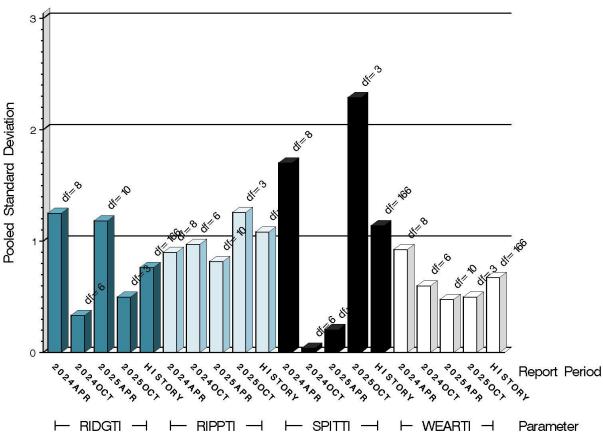




Results for 155-1/155-2 are not included in this SPIT chart due to its current targets yielding undefined calculations

L-37-1 Test Precision

TEST PRECISION POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



10:08:07 12NOV2025



L-42



October 2025



L-42 Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	17
Unacceptable Calibration Test	OC	0
Operationally Invalid Calibration Test	LC	3
Acceptable Hardware Run	NI	5
Aborted Hardware Run	XI	2
Acceptable Discrimination Test	AS	4
Operationally Invalid Discrimination Test	LS	2
Unacceptable Discrimination Test	MS	1
Total		34



L-42 Failed Tests

Test Status	Validity Code	#
Unacceptable Calibration Test	OC	0
Total		



L-42 Lost Tests

Test Status	Validity Code	#
Faulty pinion torque meter	LC	3
High temp	XI	1
Axle noise	XI	1
Faulty pinion torque meter	LS	2
Unacceptable discrimination	MS	1
Total		8



L-42 Summary of Severity & Precision

Severity

Pinion scoring ended the reporting period exceeding the action limit in the mild direction.

Precision

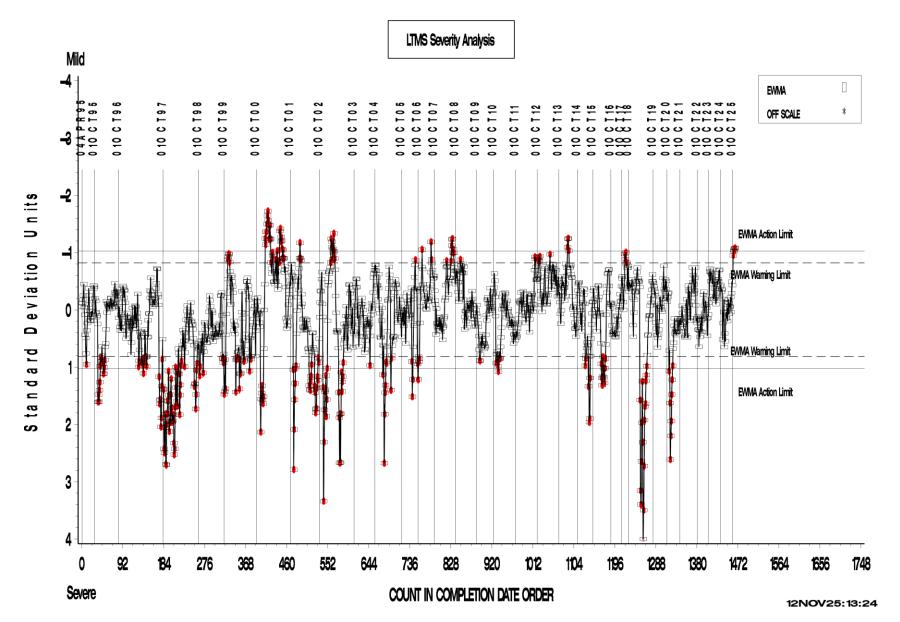
Pinion scoring started the period exceeding the action limit, but returned within the limits.



L-42 INDUSTRY OPERATIONALLY VALID DATA



FINAL EOT PINION SCORING COAST SIDE

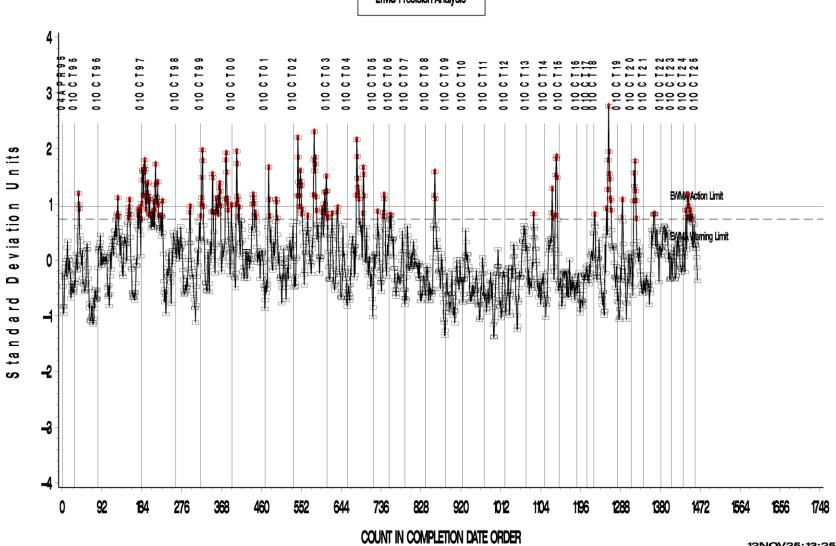


L-42 INDUSTRY OPERATIONALLY VALID DATA



FINAL EOT PINION SCORING COAST SIDE



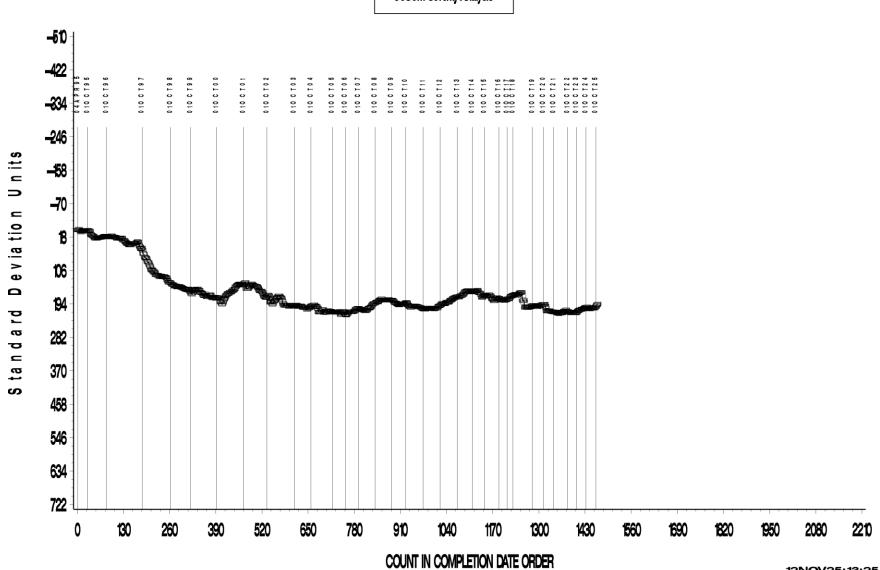


L-42 INDUSTRY OPERATIONALLY VALID DATA



FINAL EOT PINION SCORING COAST SIDE





L-42 Test Precision

		Pooled Standard Deviation			
Lab	Coast Side Pinion Scoring ∆/s	df	Coast Side Pinion Scoring		Shock Series I Coast Side Ring Scoring
Α	-1.28	3	1.41	1.15	0.00
В	1.09	1	0.00	1.41	0.00
D	-0.24	5	5.16	5.27	0.00
G	-0.23	3	2.99	3.50	0.00

Return to Table of Contents



HTCT



October 2025



HTCT Activity

No HTCT test activity this reporting period.



OSCT



October 2025



OSCT Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	14
Unacceptable Calibration Test	OC	0
Unacceptable Info Run (Elastomer Approval)	MI	0
Acceptable Info Run (Elastomer Approval)	NI	24
Total		38



OSCT - Failed Tests

Test Status	Validity Code	#
No unacceptable tests this period	OC	0
Total		0

OSCT - Lost Tests

Test Status	Validity Code	#
No lost tests this period		
Total		0



OSCT Test Severity

Severity:

- The combined elastomer plots show that all parameters remained within the limits this period.
- The individual elastomer plots showed that NI SAHA and NI PELA both remain outside of the action limits.



OSCT Test Severity

Precision:

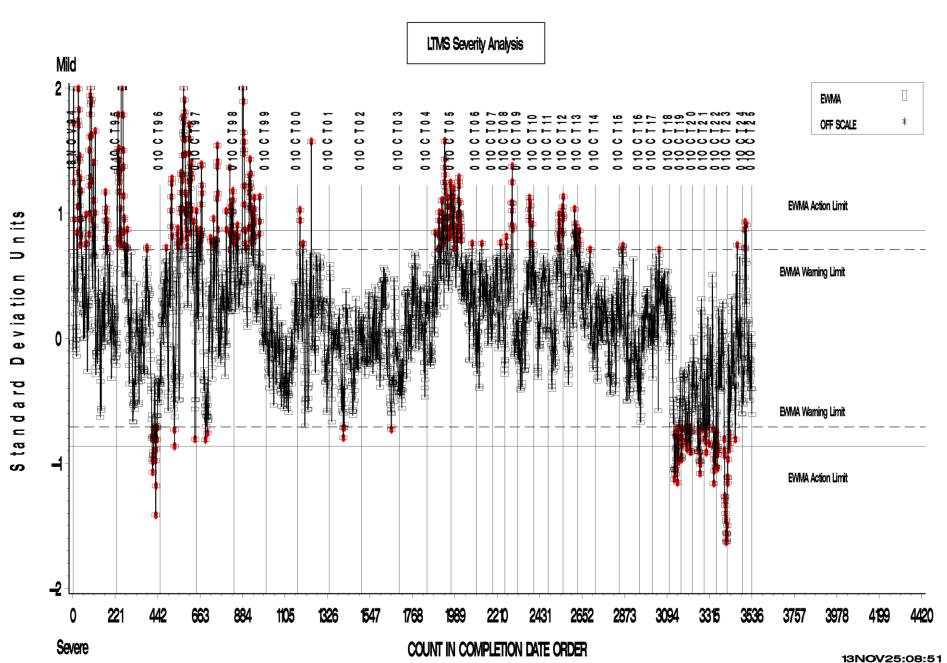
• The combined elastomer plots show that all parameters remained within the limits this period.



OSCT INDUSTRY OPERATIONALLY VALID DATA

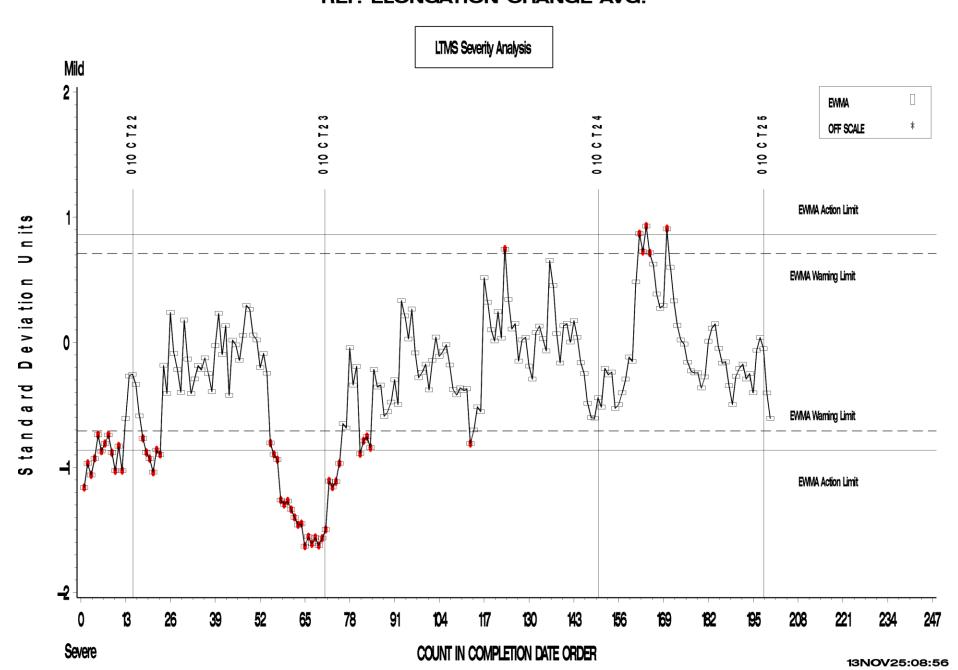
(FMC)

REF. ELONGATION CHANGE AVG.



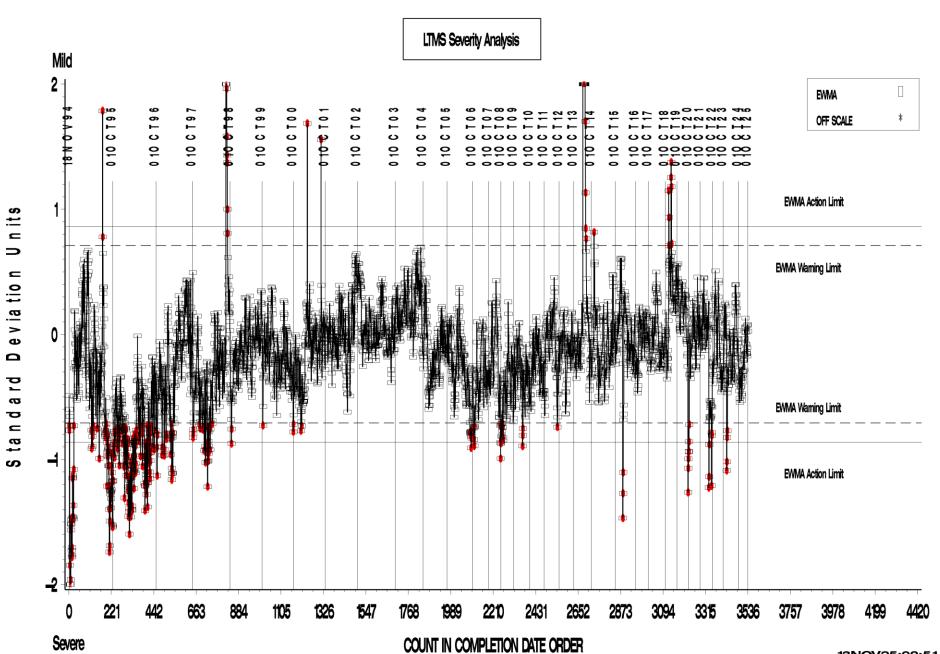
OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. ELONGATION CHANGE AVG.





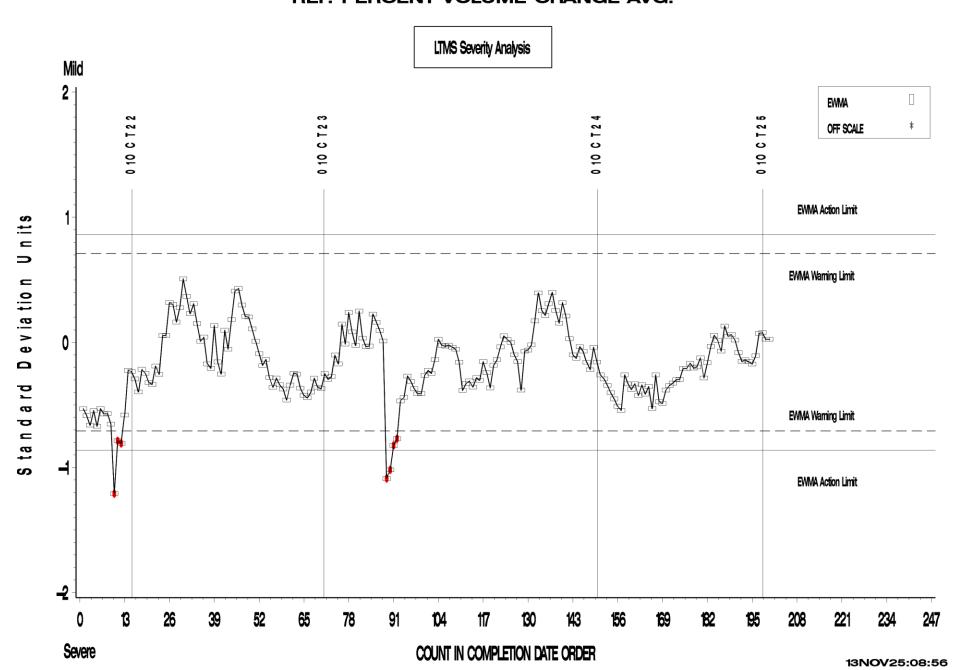
OSCT INDUSTRY OPERATIONALLY VALID DATA

REF. PERCENT VOLUME CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. PERCENT VOLUME CHANGE AVG.

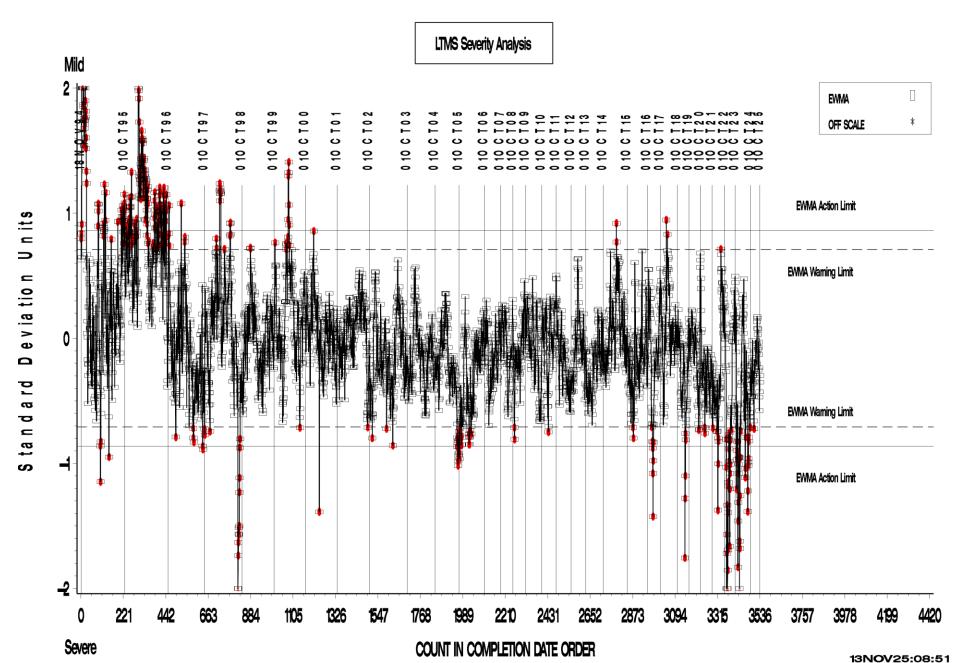




OSCT INDUSTRY OPERATIONALLY VALID DATA

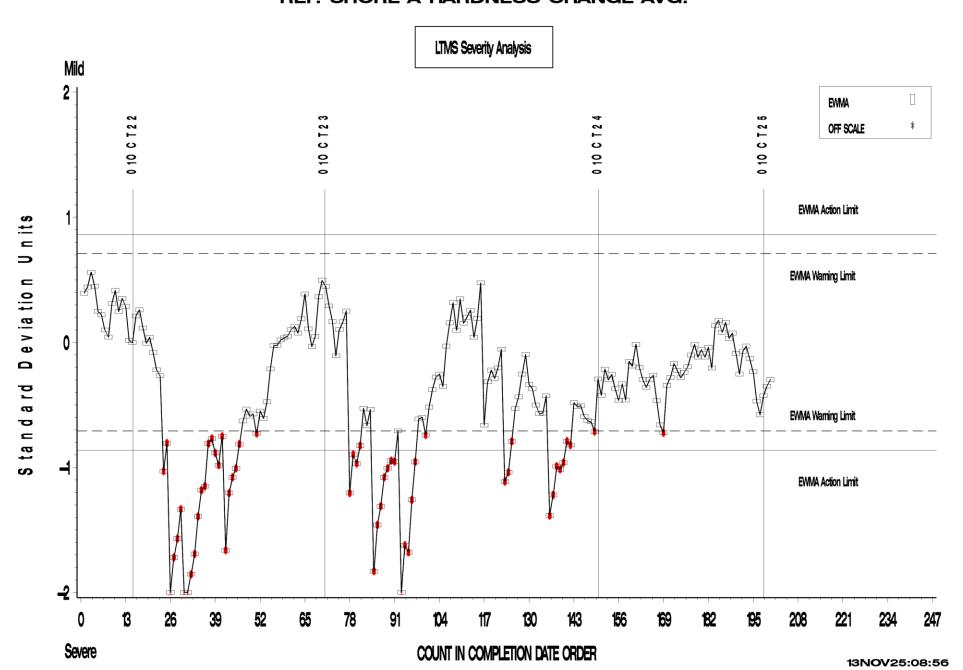


REF. SHORE A HARDNESS CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. SHORE A HARDNESS CHANGE AVG.



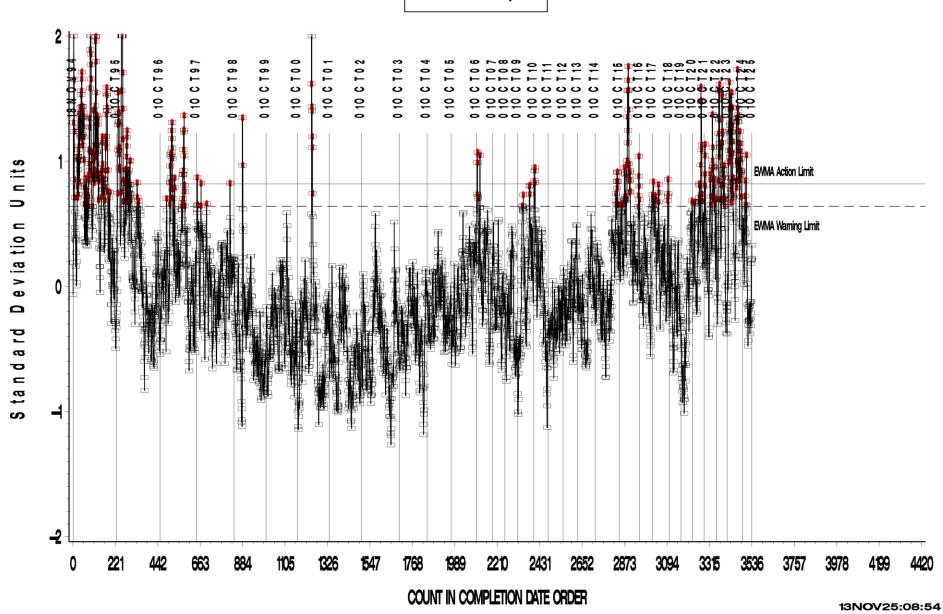


OSCT INDUSTRY OPERATIONALLY VALID DATA



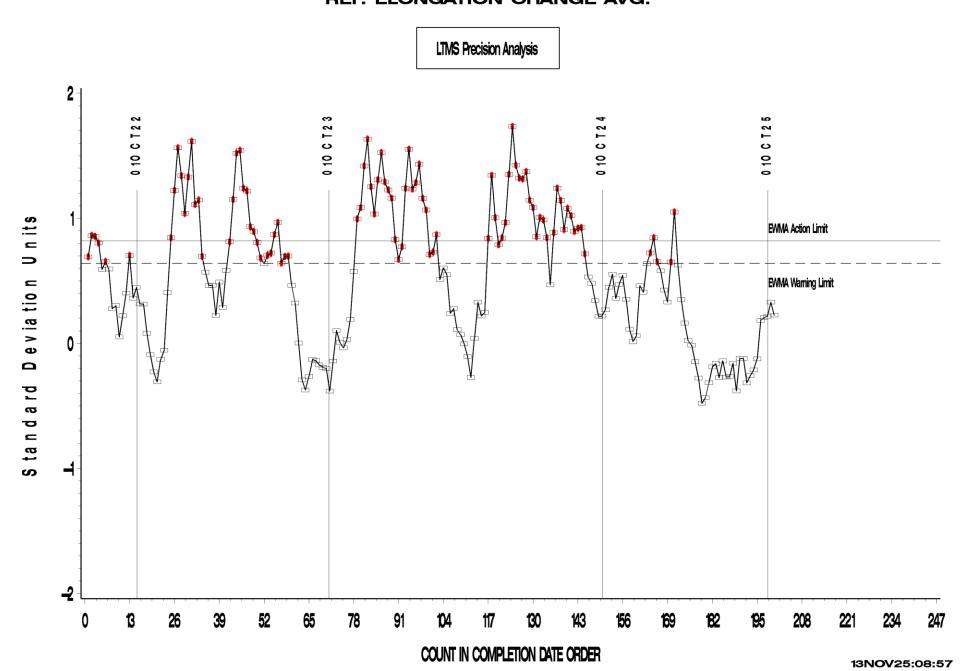
REF. ELONGATION CHANGE AVG.





OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. ELONGATION CHANGE AVG.

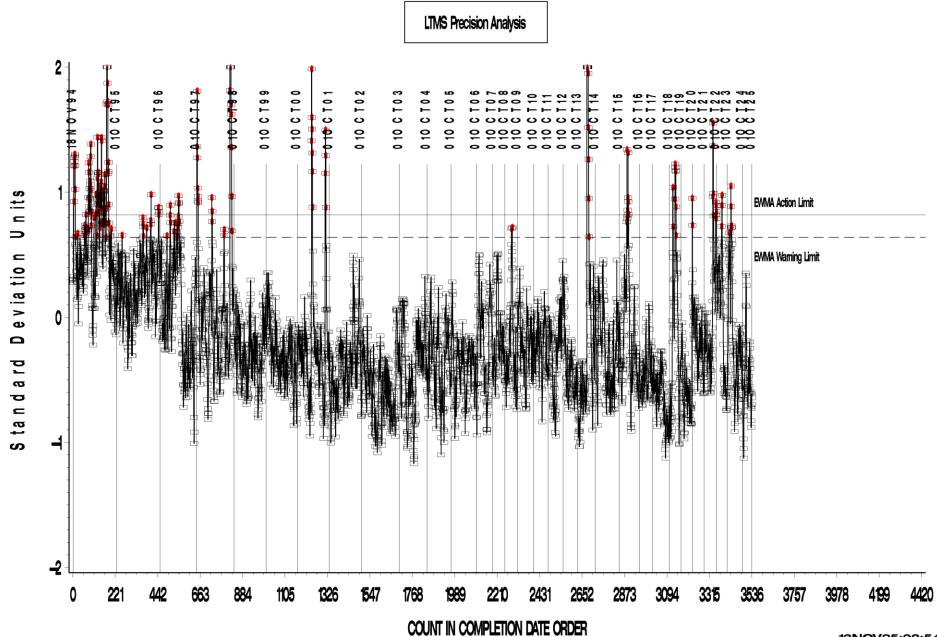




OSCT INDUSTRY OPERATIONALLY VALID DATA

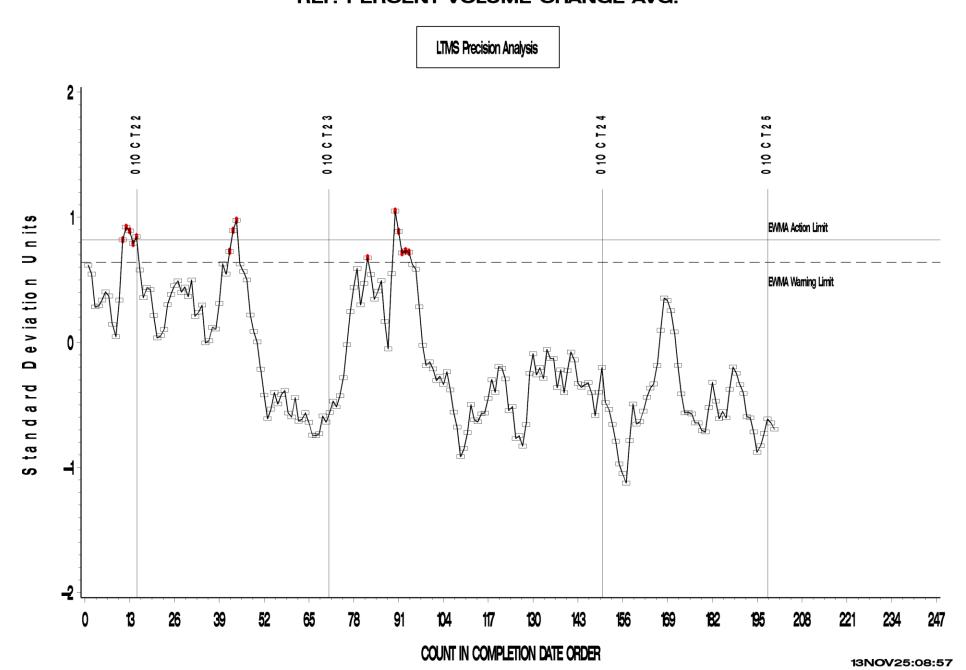


REF. PERCENT VOLUME CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. PERCENT VOLUME CHANGE AVG.

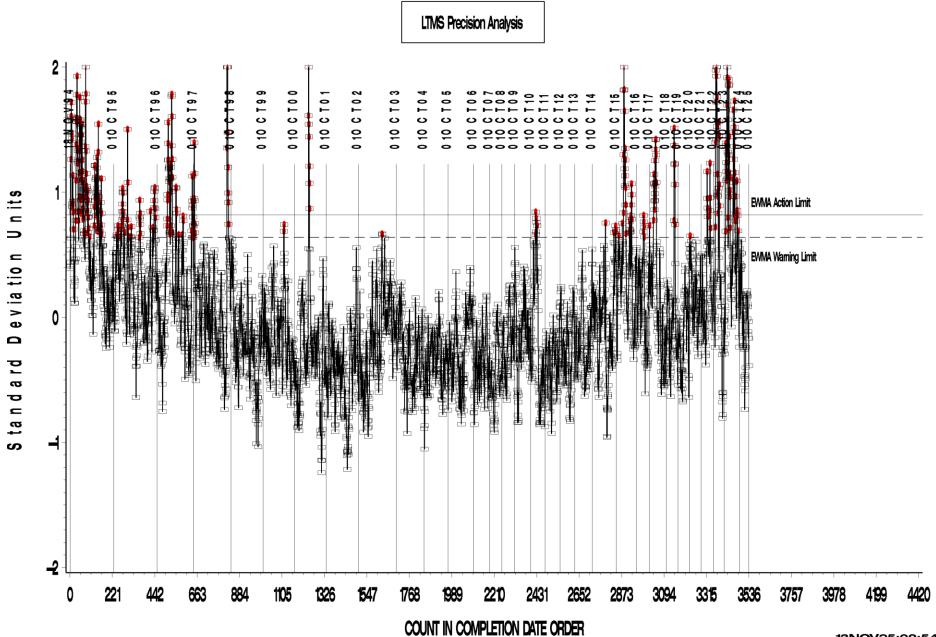




OSCT INDUSTRY OPERATIONALLY VALID DATA

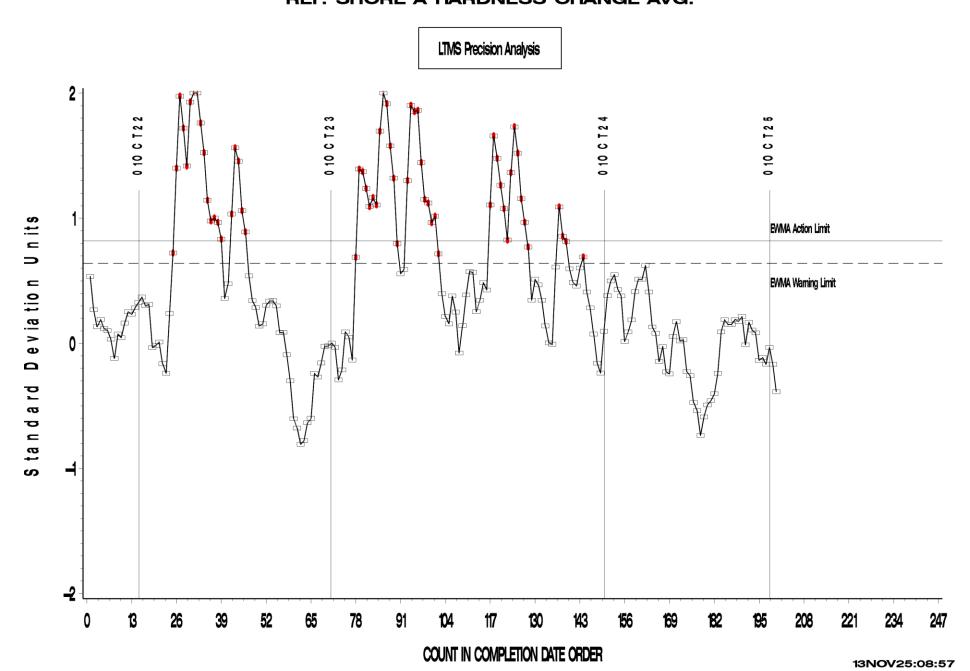


REF. SHORE A HARDNESS CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. SHORE A HARDNESS CHANGE AVG.

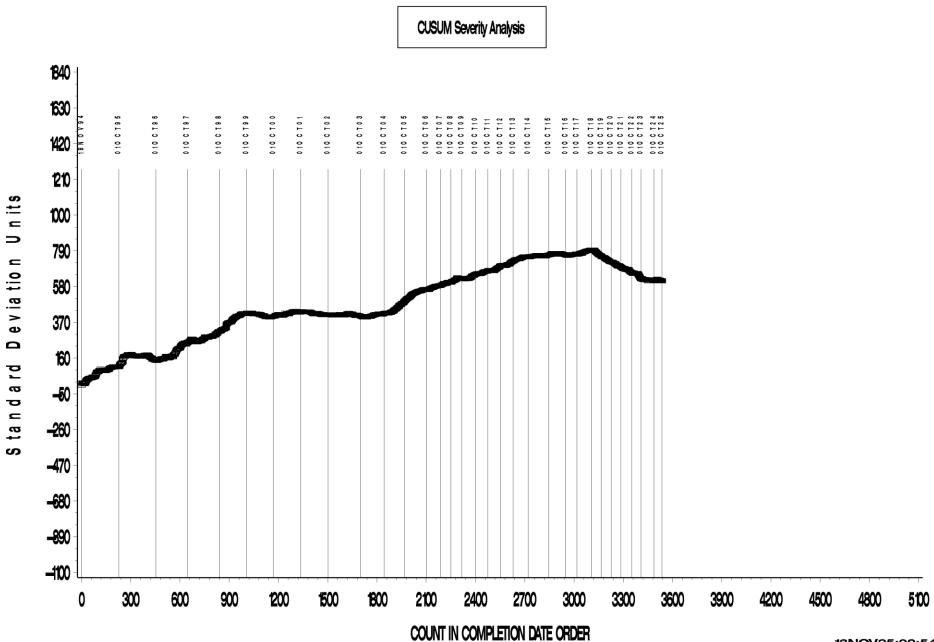




OSCT INDUSTRY OPERATIONALLY VALID DATA

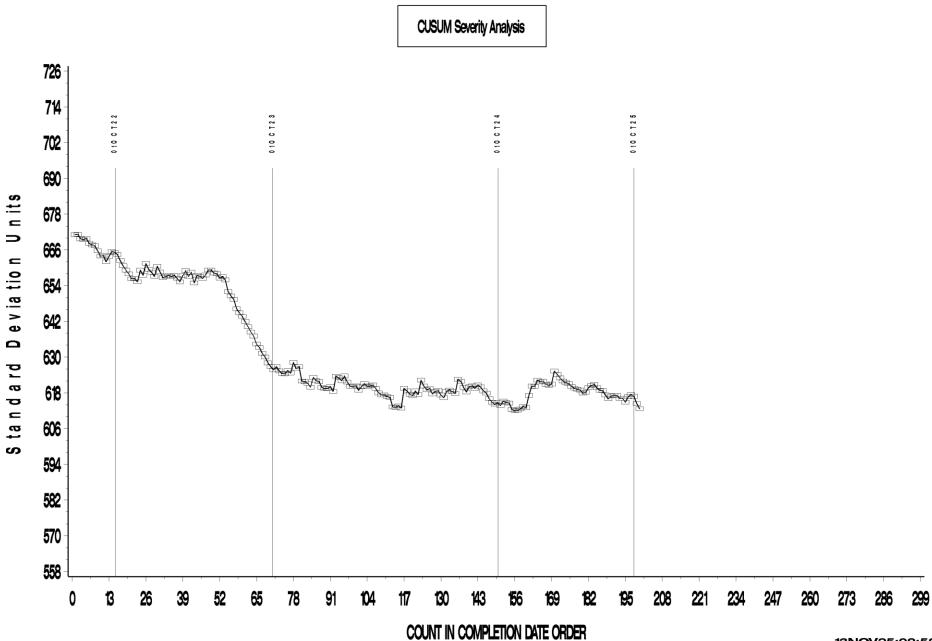


REF. ELONGATION CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points REF. ELONGATION CHANGE AVG.

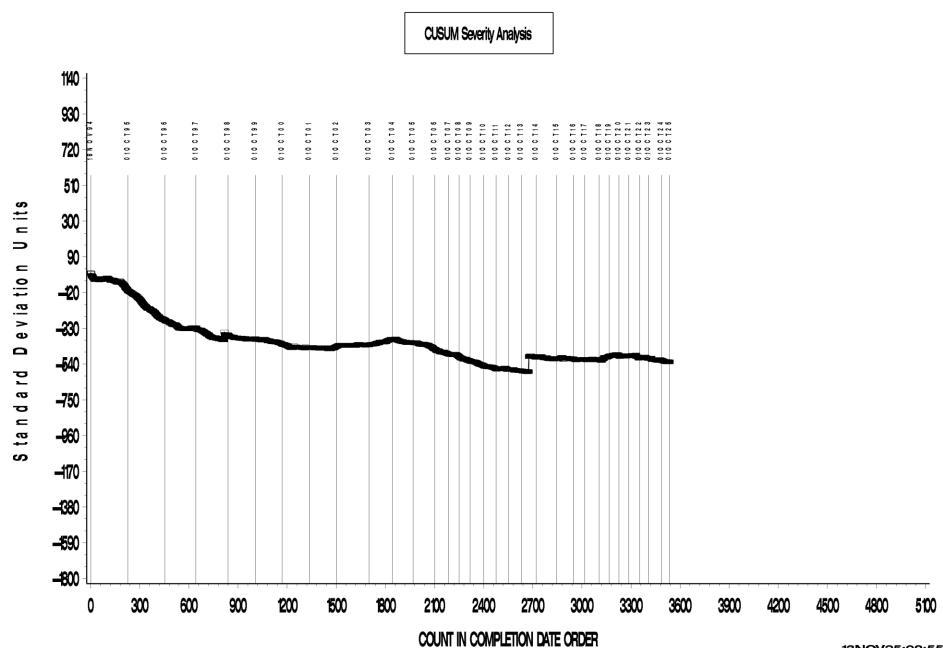




OSCT INDUSTRY OPERATIONALLY VALID DATA

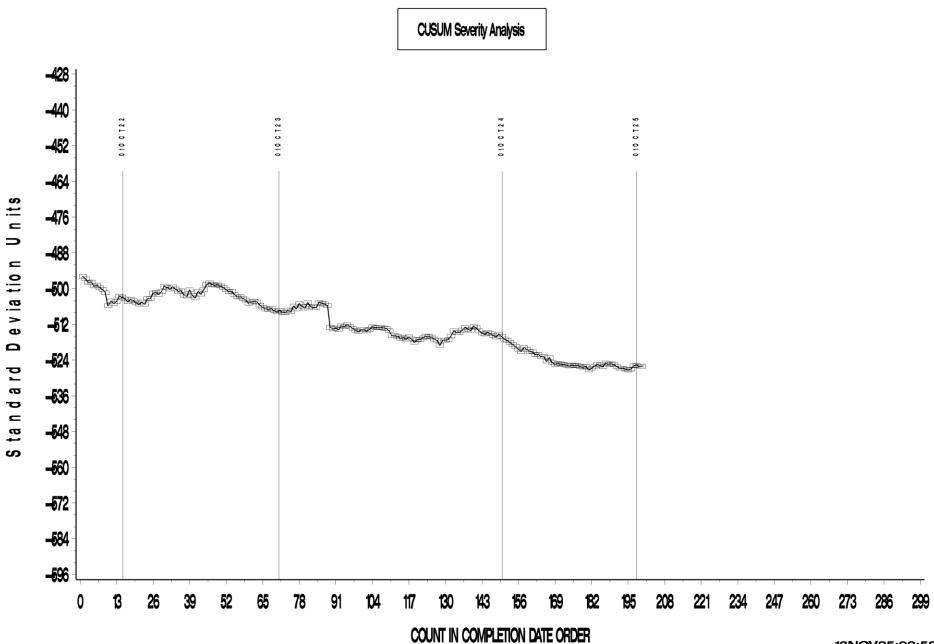


REF. PERCENT VOLUME CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA Zoomed to 200 Most Recent Data Points **REF. PERCENT VOLUME CHANGE AVG.**

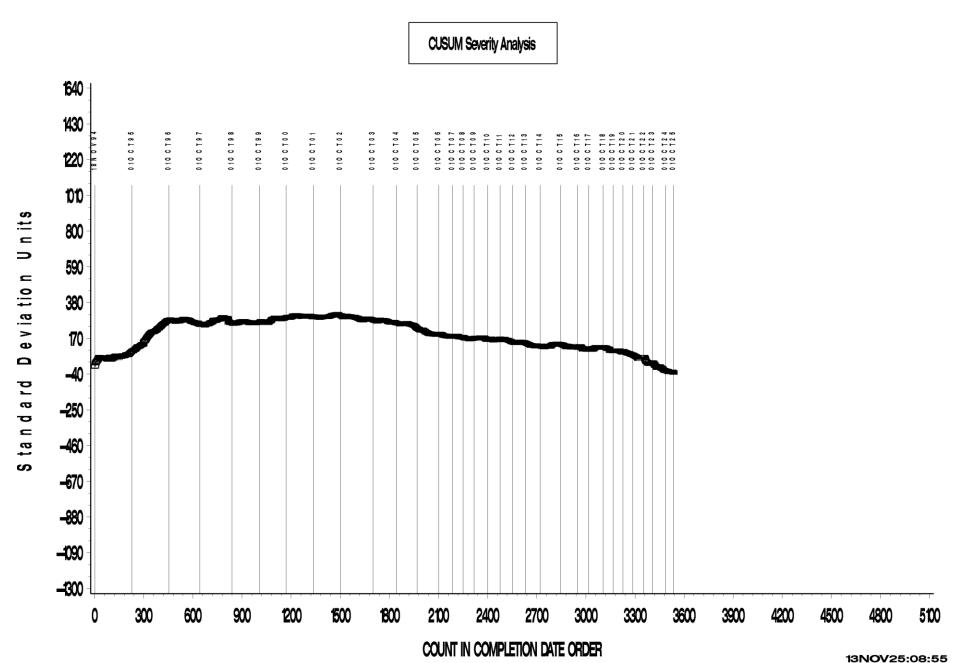




OSCT INDUSTRY OPERATIONALLY VALID DATA

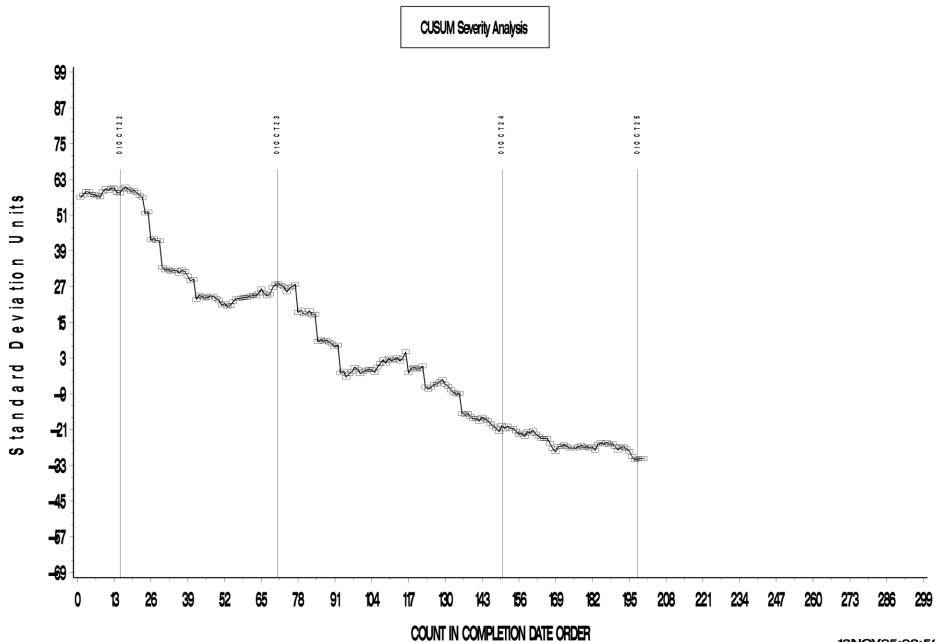


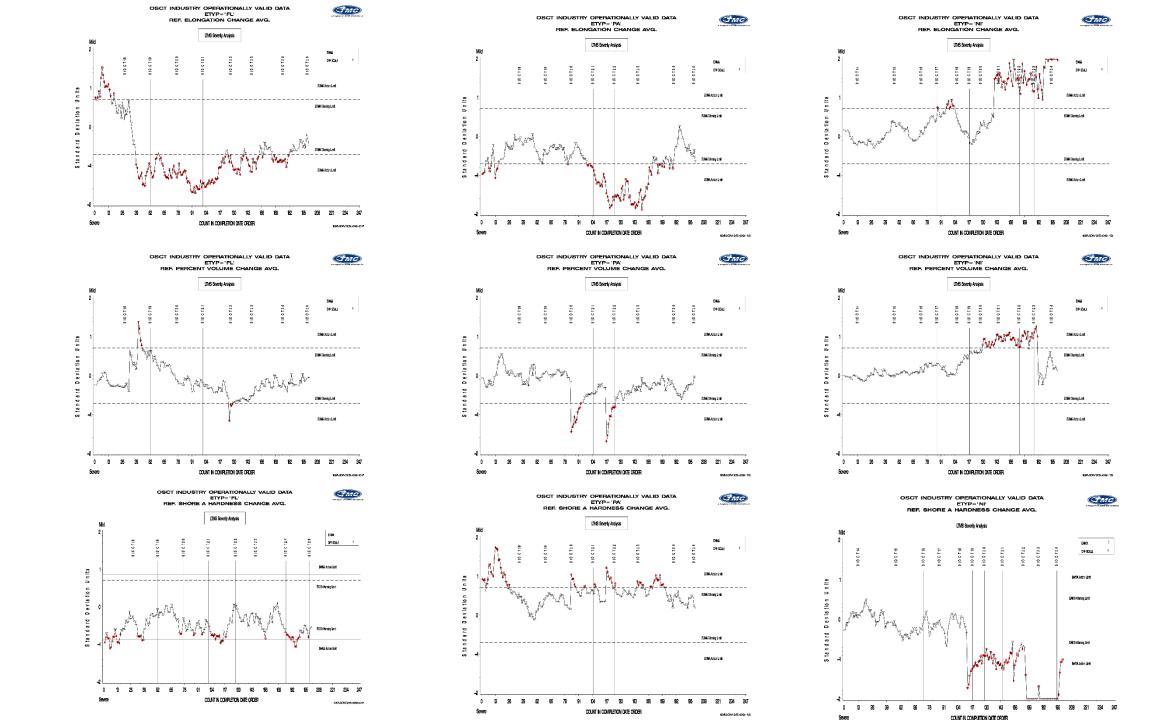
REF. SHORE A HARDNESS CHANGE AVG.



OSCT INDUSTRY OPERATIONALLY VALID DATA **Zoomed to 200 Most Recent Data Points** REF. SHORE A HARDNESS CHANGE AVG.



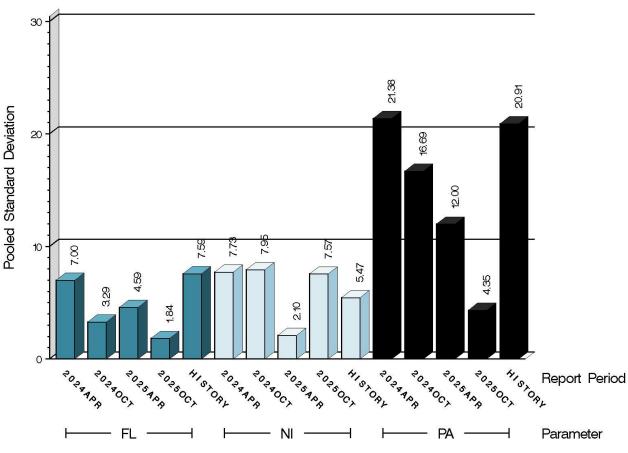




OSCT Precision Estimates

%ELONGATION PRECISION

POOLED STANDARD DEVIATION
BY SIX-MONTH ASTM REPORT PERIOD



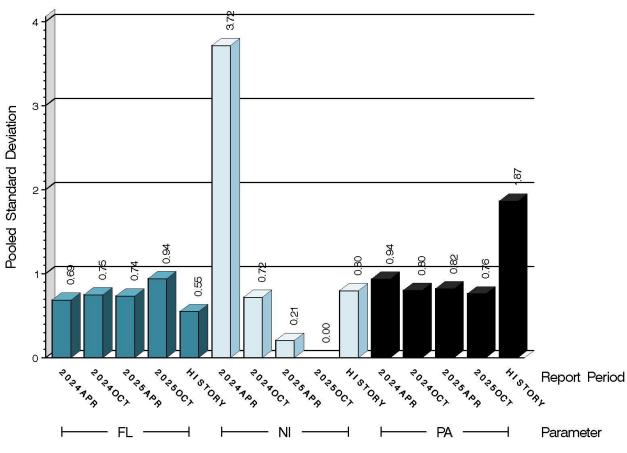
6:45:32 13NOV2025



OSCT Precision Estimates

%VOLUME CHANGE PRECISION POOLED STANDARD DEVIATION

BY SIX-MONTH ASTM REPORT PERIOD

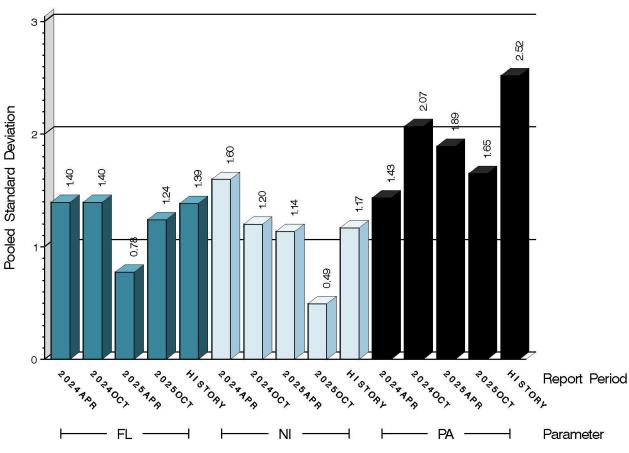






OSCT Precision Estimates

S.A. HARDNESS PRECISION POOLED STANDARD DEVIATION BY SIX-MONTH ASTM REPORT PERIOD



6:45:32 13NOV2025



L37 RC



October 2025



L37RC Activity

Test Status	Validity Code #	
Acceptable Calibration Test	AC 16	
Unacceptable Calibration Test	OC 10	
Total	26	



L37RC Activity

Test Status	Validity	
Test status	Code	#
Unacceptable Calibration Test (Mild)	OC	0
Unacceptable Calibration Test (Severe)	OC	9
Unacceptable Calibration Test (Multiple)	OC	1
Unacceptable Calibration Test (Precision)	OC	0
Total		10



L37RC Test Severity

Severity:

 WEAR, RIPP, RIDG exceeded the action limit in the mild direction during this reporting period and have since returned within limits.

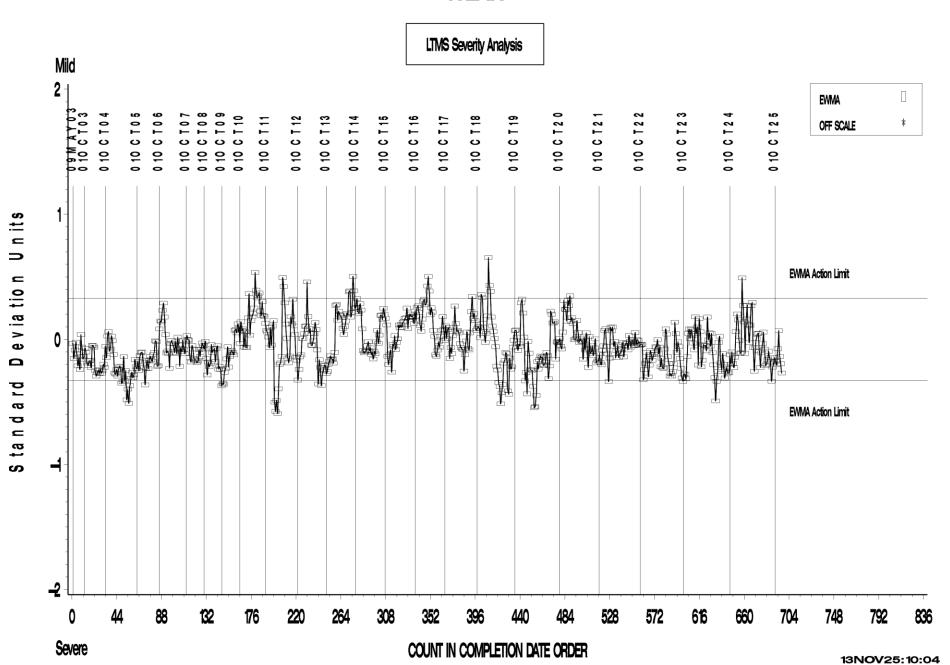
Precision:

All parameters remained within the action limit this period.



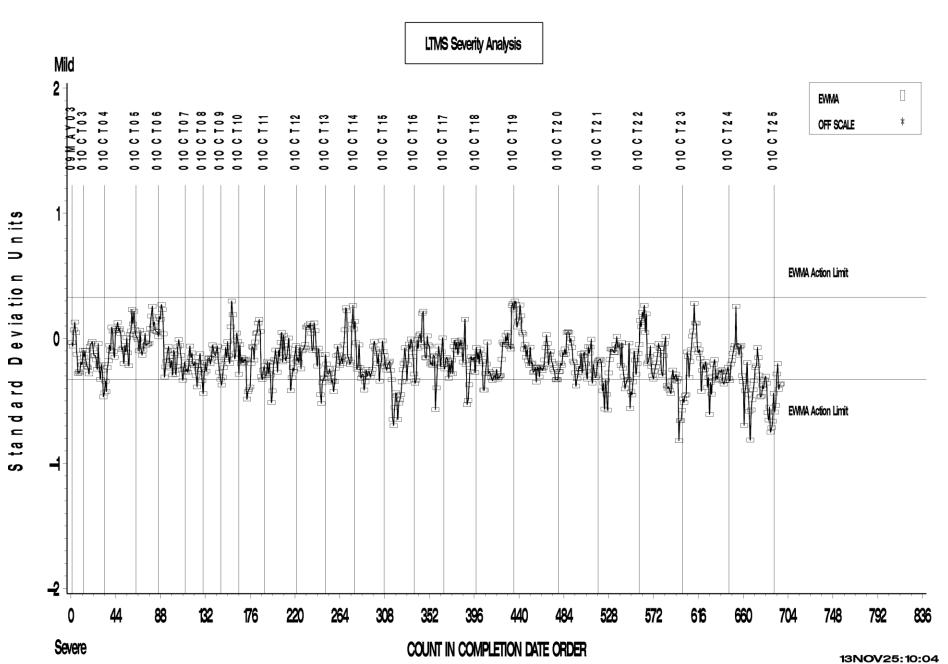


WEAR



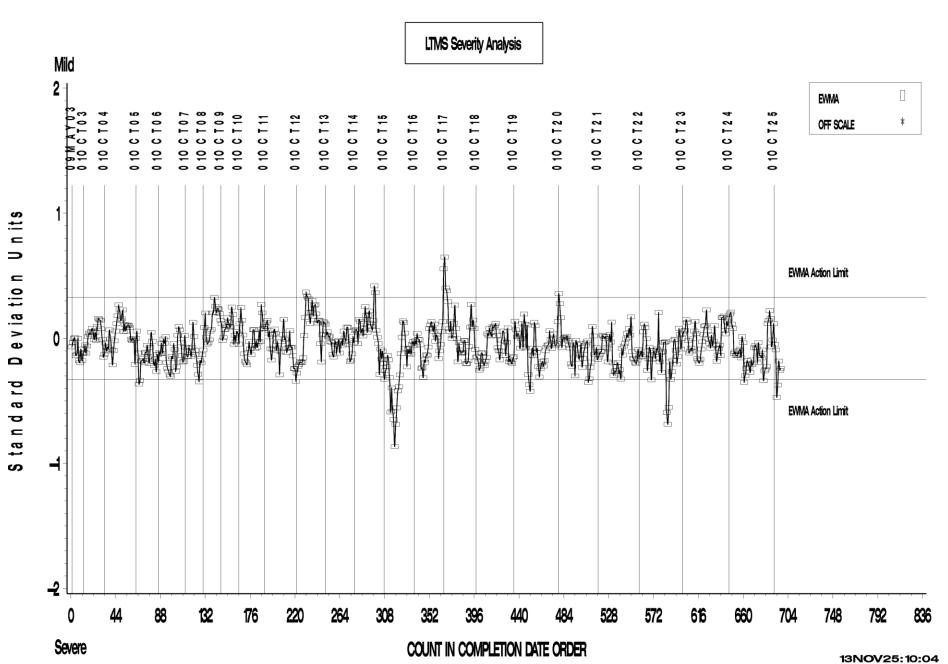


RIDGING



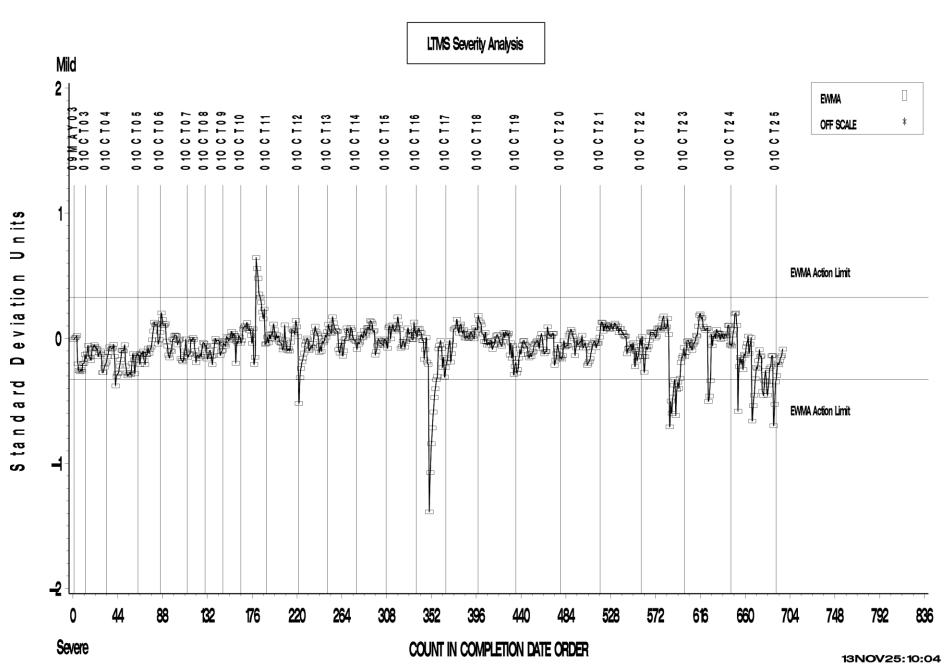


RIPPLING



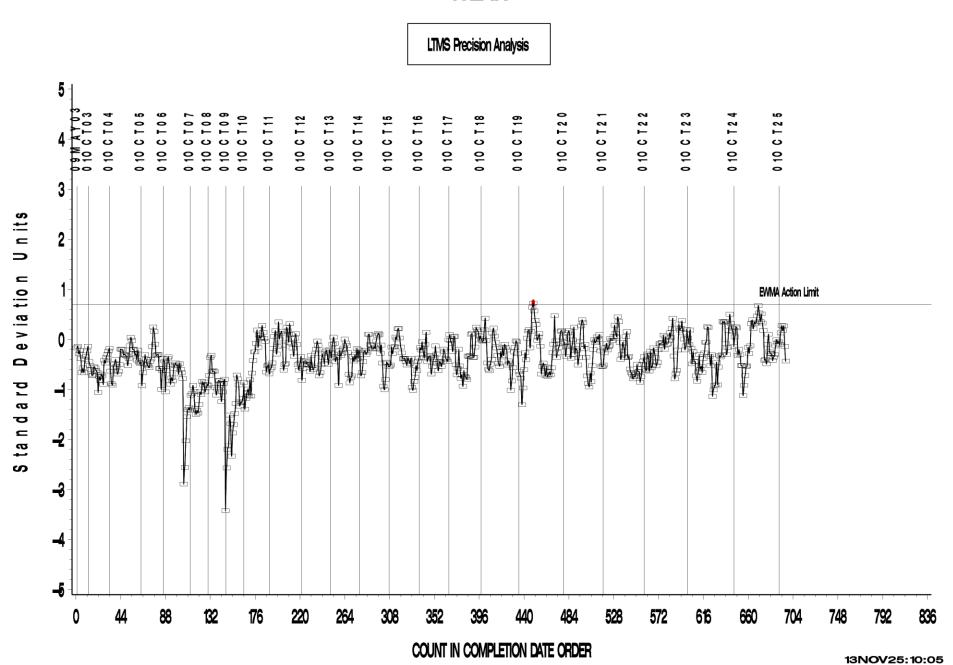


SPITTING



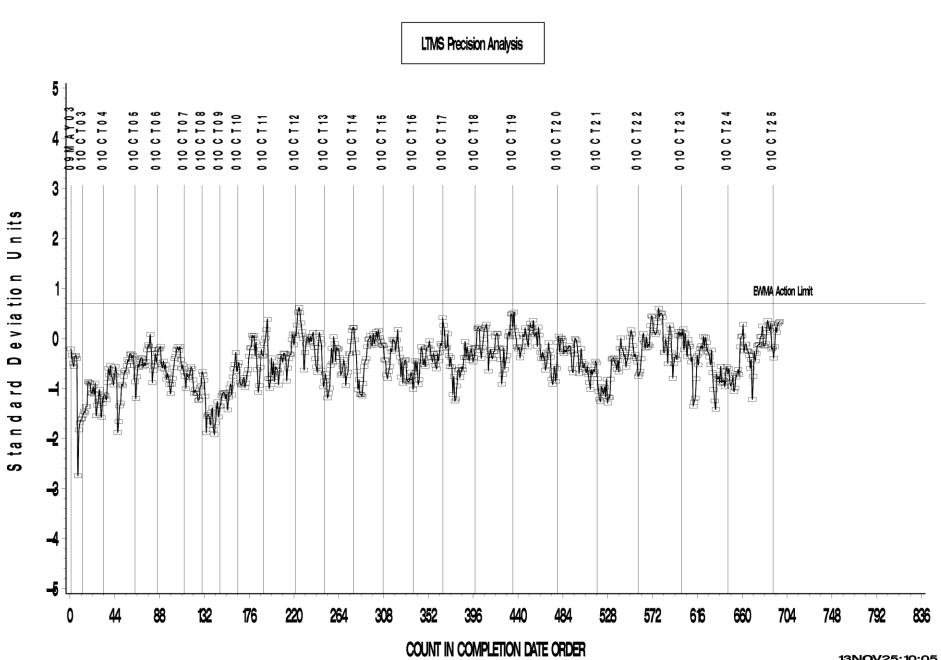


WEAR





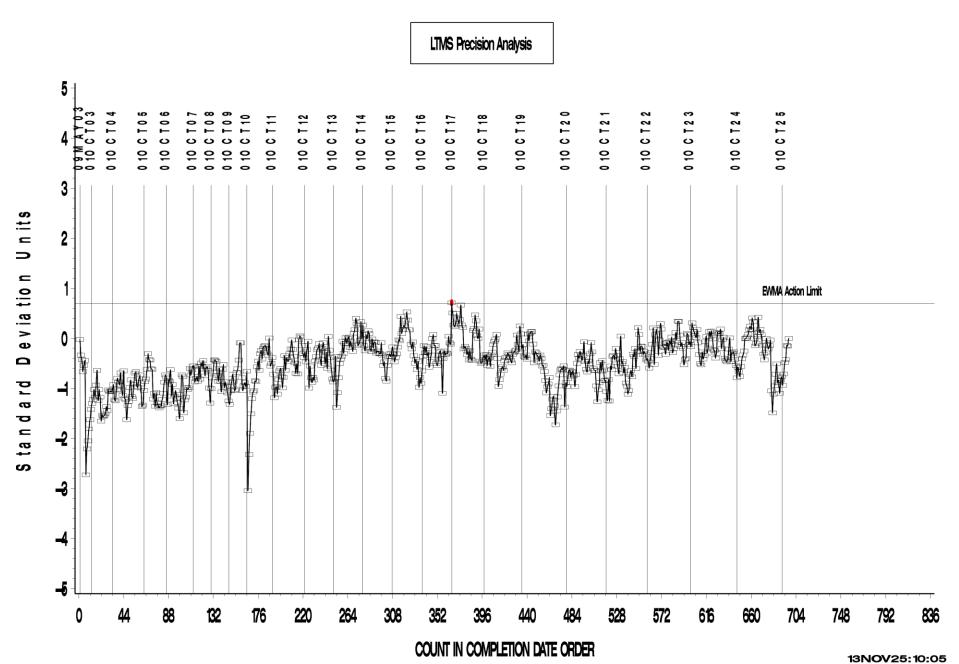
RIPPLING



13NOV25:10:05

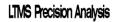


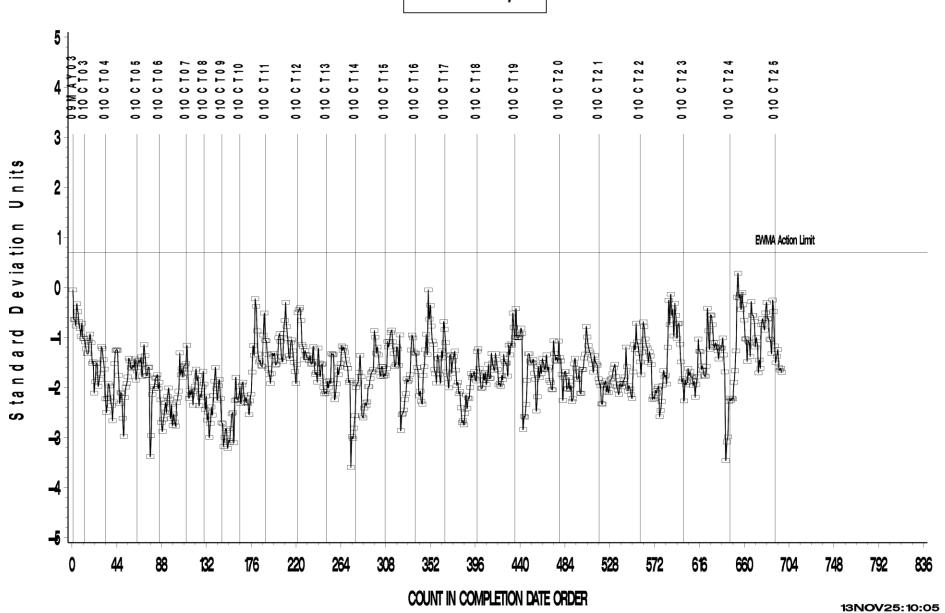
RIDGING





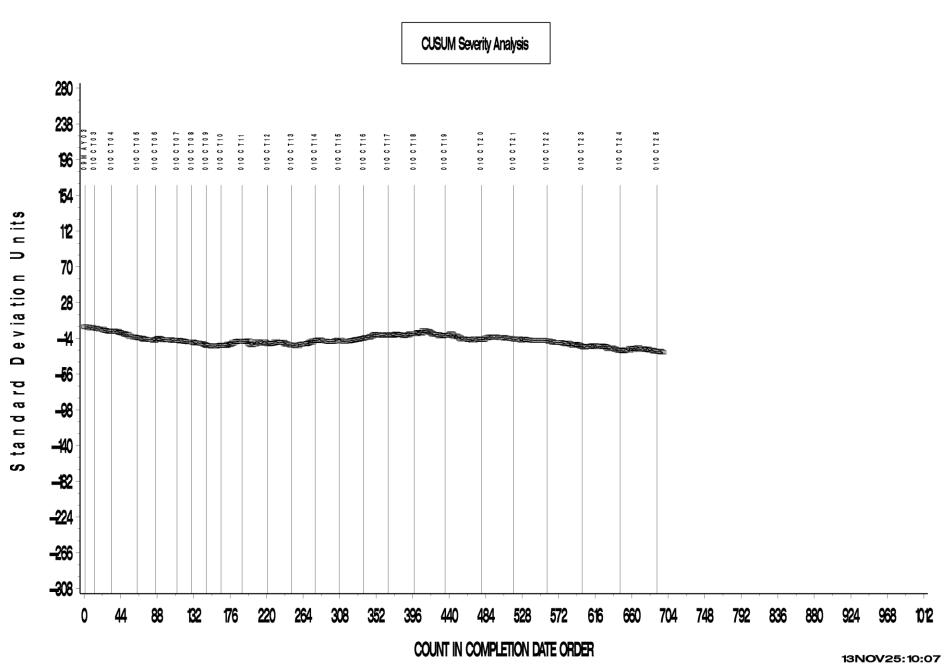
SPITTING





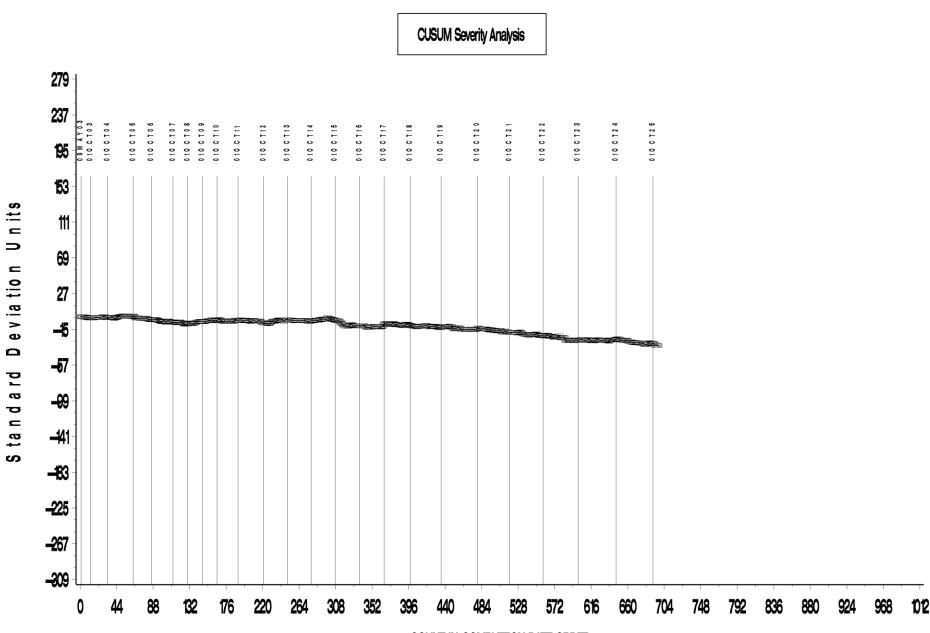






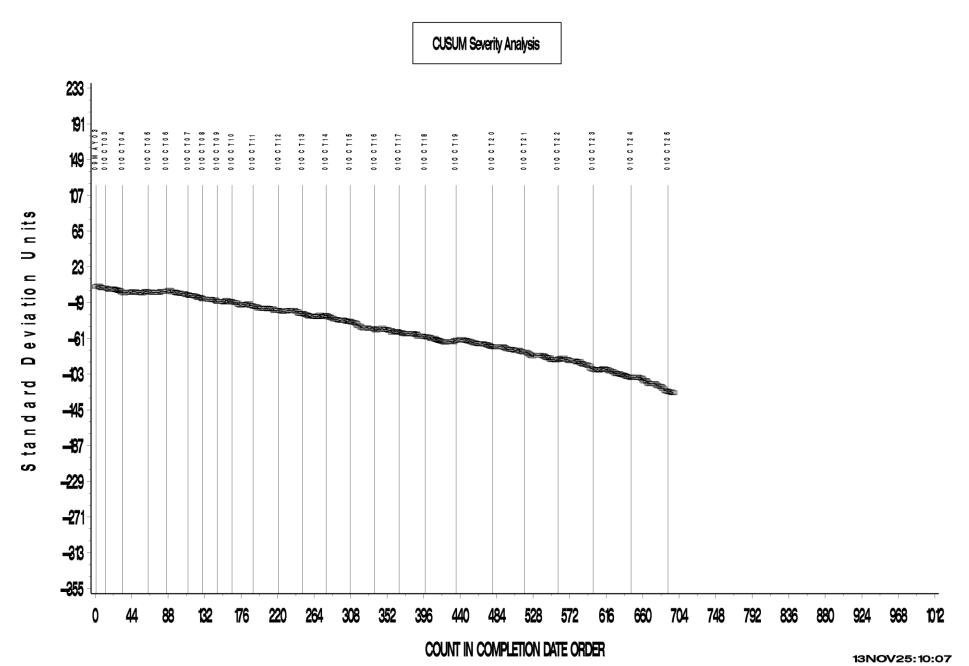


RIPPLING



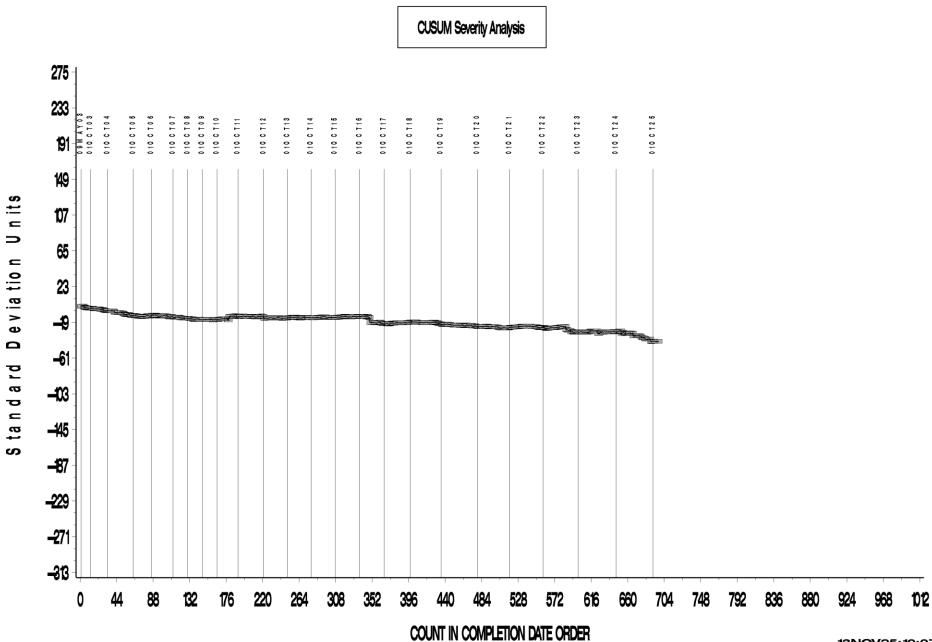


RIDGING

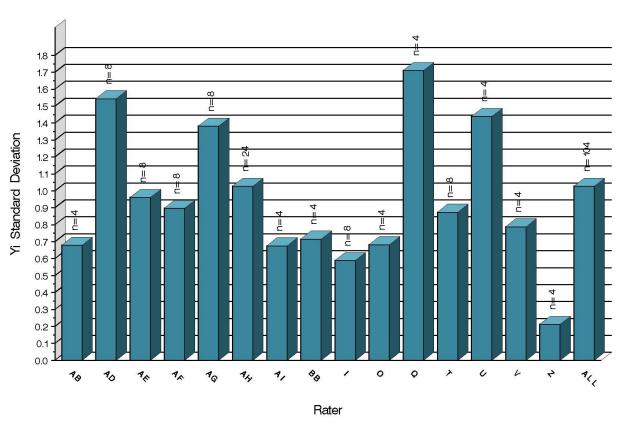




SPITTING



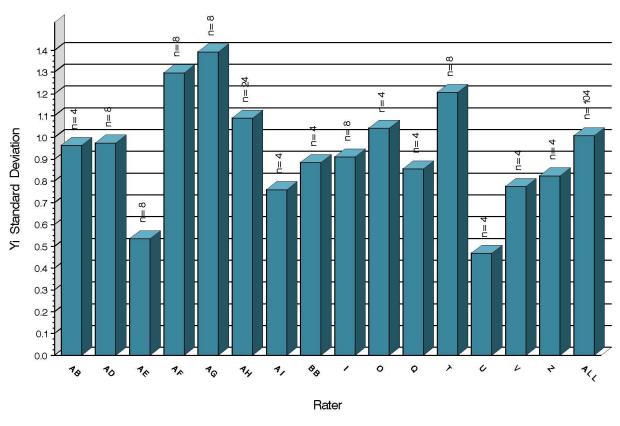
WEAR
Precision as Measured by Yi STD



0.41-07 19NIOW000E



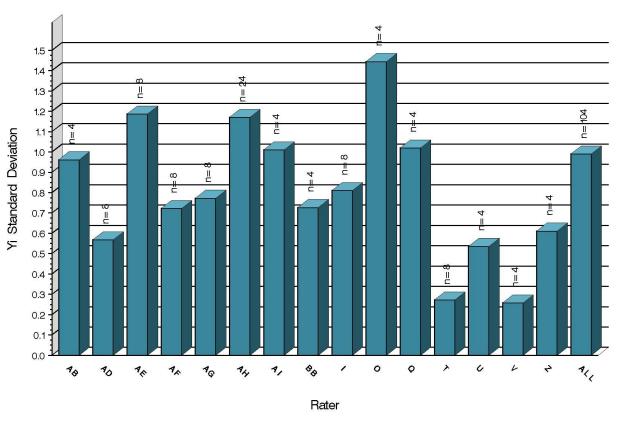
RIPPLING Precision as Measured by Yi STD



0-41-27 19NIOW2026





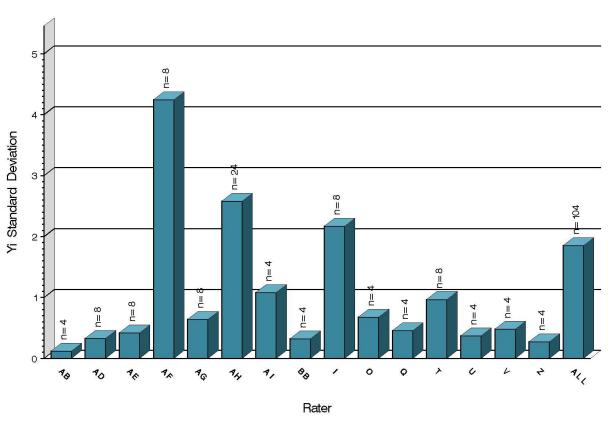


9:41:27 13NOV2025



SPITTING

Precision as Measured by Yi STD



9:41:27 13NOV2025



L42RC



October 2025



L42RC Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	18
Unacceptable Calibration Test	OC	3
Total		21



L42RC - Failed Test

Test Status	Validity Code	#
Unacceptable Calibration Test (Mild)	OC	0
Unacceptable Calibration Test (Severe)	OC	2
Unacceptable Calibration Test (Multiple)	OC	0
Unacceptable Calibration Test (Precision)	OC	1
Total		3



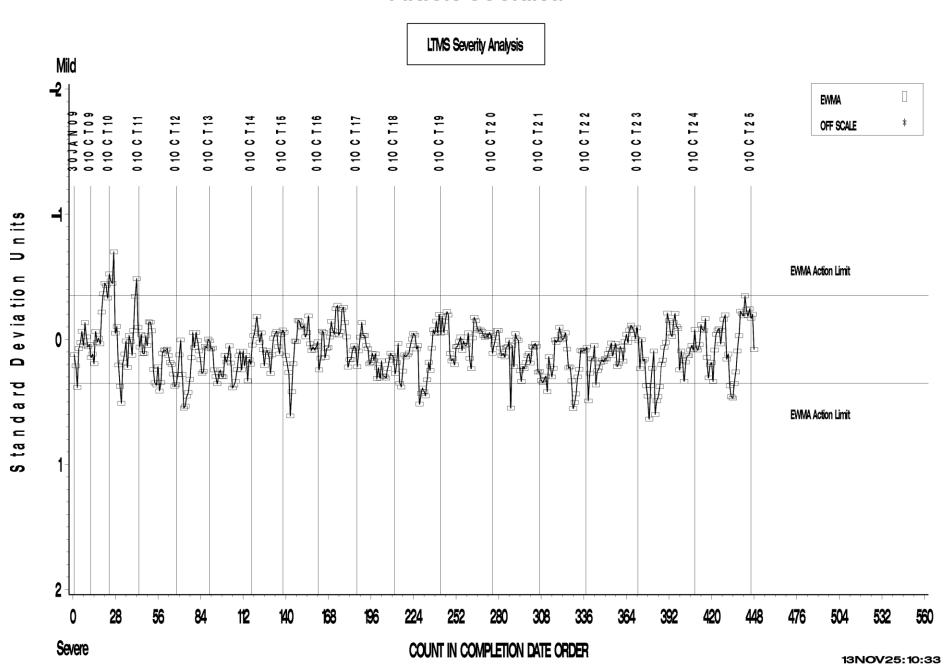
L42RC Test Severity

- Severity:
 - Ring scoring exceeded the action limit in the mild direction this period but finished the period within limits. Pinion scoring remained within the limits this period.
- Precision:
 - All parameters remained within the limits this reporting period.



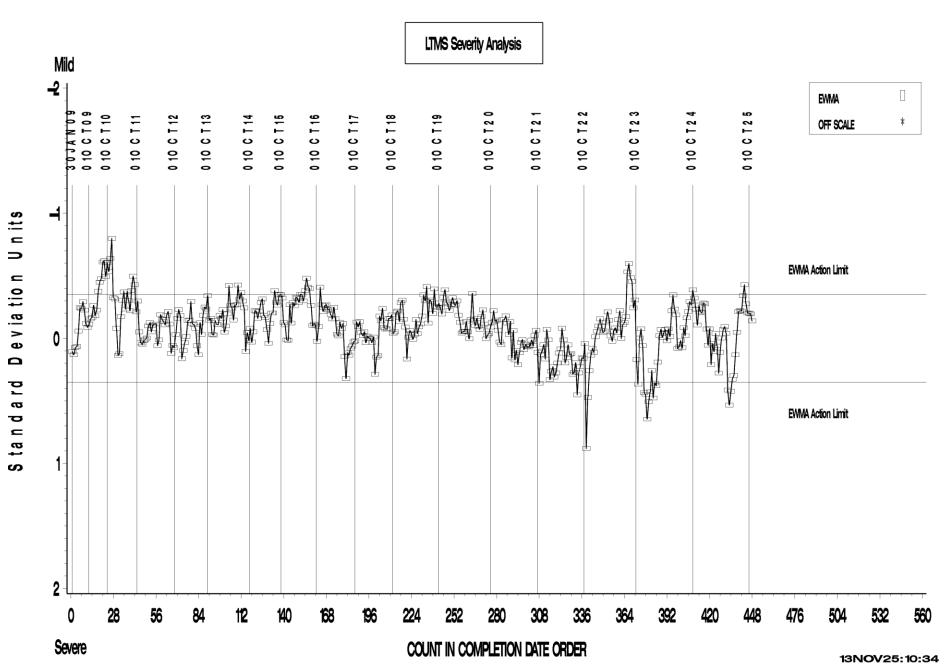


PINION SCORING



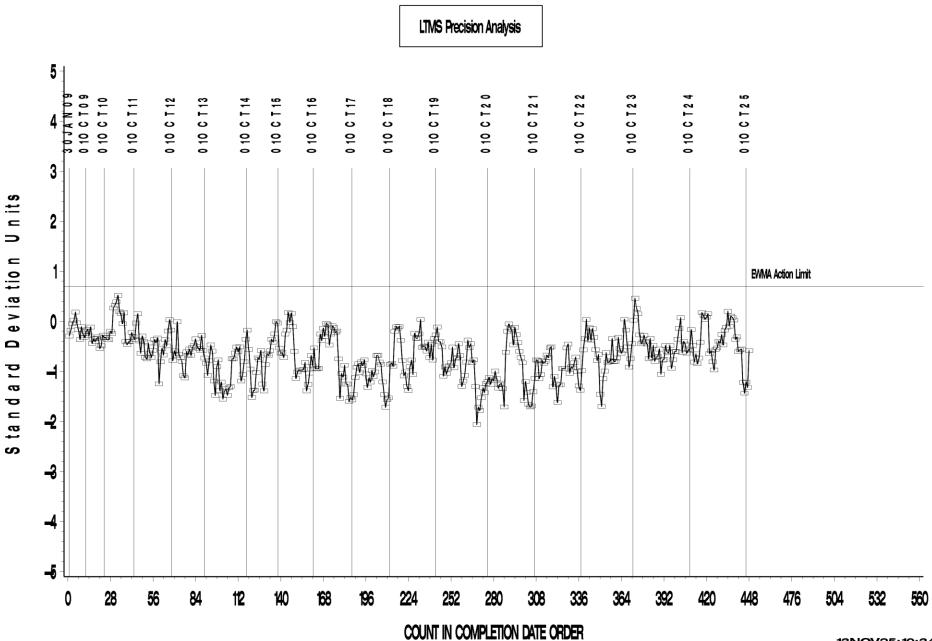


RING SCORING



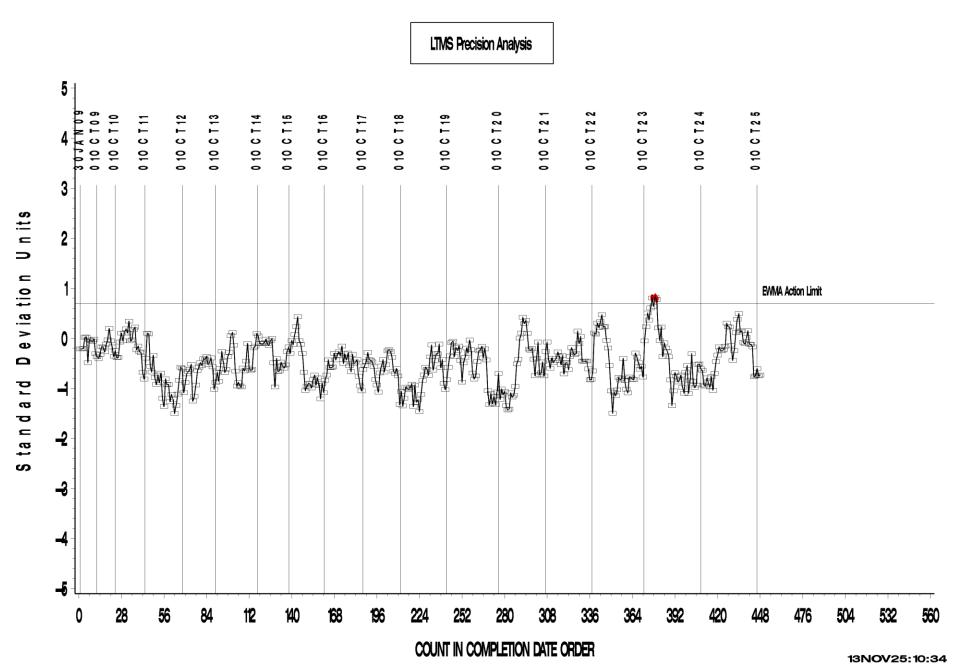


PINION SCORING



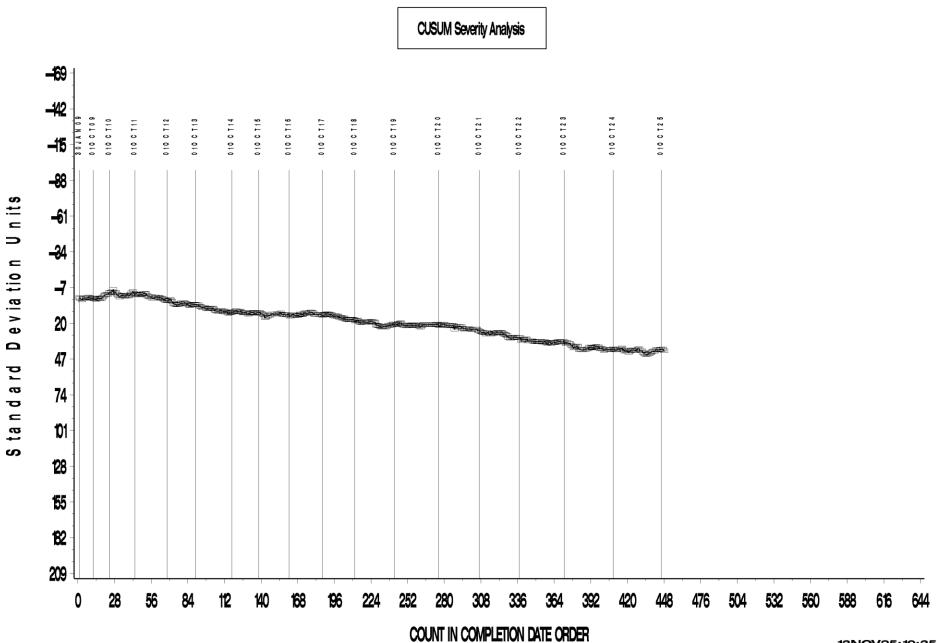


RING SCORING





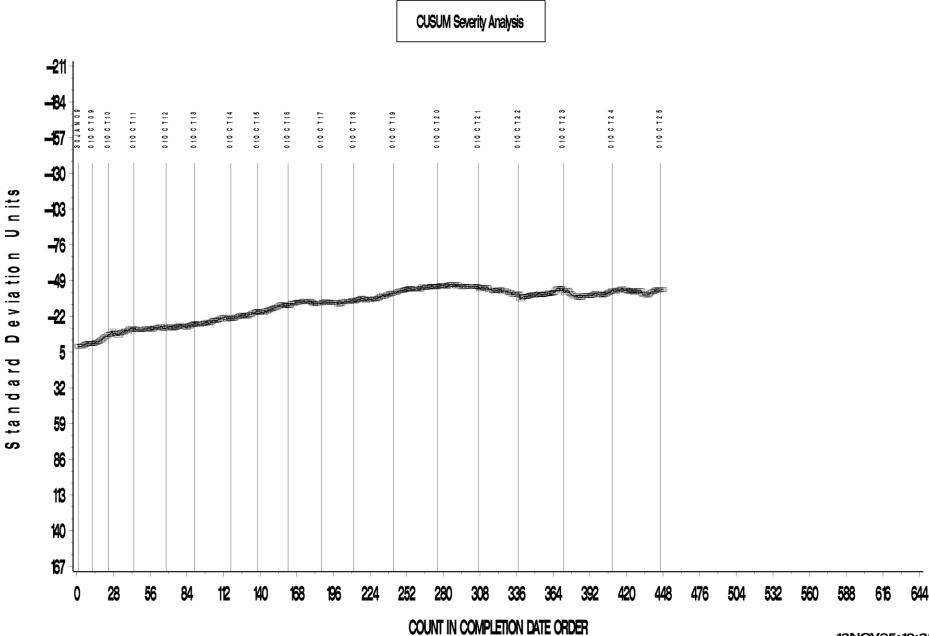
PINION SCORING



13NOV25:10:35



RING SCORING

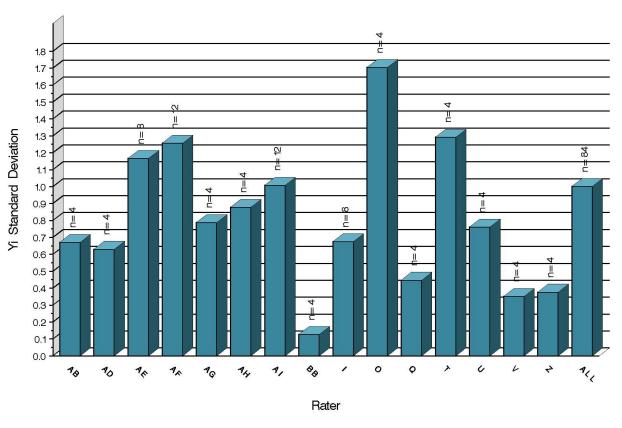


13NOV25:10:35

L42RC Pinion Scoring Estimates

PINION SCORING

Precision as Measured by Yi STD



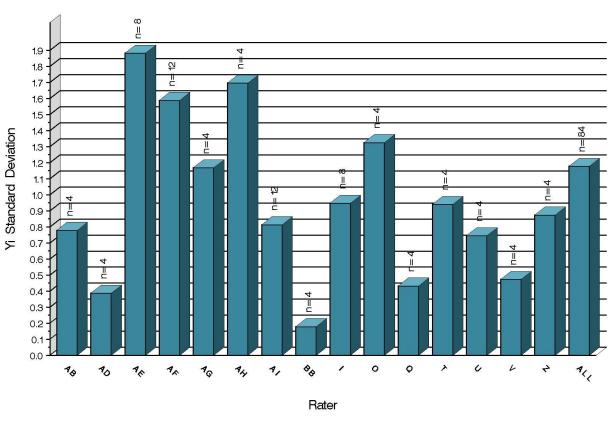
10:20:08 13NOV2025

Return to Table of Contents



L42RC Ring Scoring Estimates

RING SCORING Precision as Measured by Yi STD



10:00:08 10NIOW000E

Return to Table of Contents



L-60-1



October 2025



L-60-1 Activity

Test Status	Validity Code	#
Acceptable Calibration Test	AC	19
Failed Calibration Test	OC	12
Operationally Invalid Calibration Test	LC	4
Acceptable Information Run	NI	12
Operationally Invalid Information Run	LI	1
Total		48



L-60-1 Failed Tests

Test Status	Validity Code	#
Failed Calibration Test (Mild)	OC	5
Failed Calibration Test (Severe)	OC	3
Failed Calibration Test (Multiple)	OC	3
Failed Calibration Test (Precision)	OC	1
Total		12



L-60-1 - Lost Tests

Test Status	Validity Code	#
High oil consumption	LC	1
Post test analytic error	LC	1
Alternator malfunction	LC	1
Post tests analytics performed after 48hrs	LC	1
Airflow out of spec	LI	1
Total		5



L-60-1 Test Severity

Severity:

- ASL, PEN, and TOL all exceeded the action limit this period in the mild direction and have since return within limits.
- VISI finished the reporting period exceeding the action limit in the severe direction.

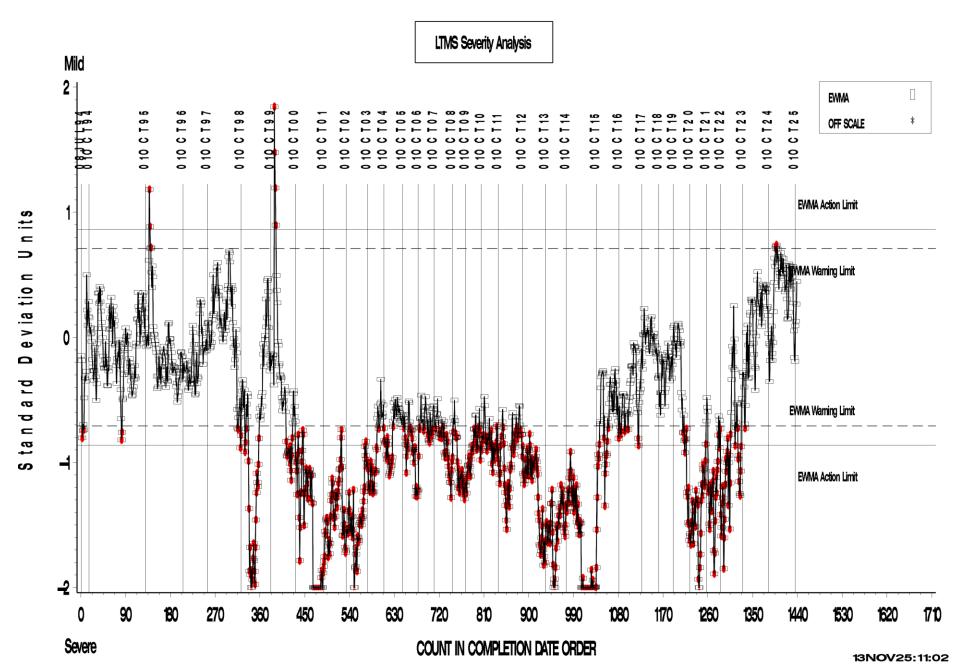
Precision:

VISI ended the reporting period exceeding the action limit



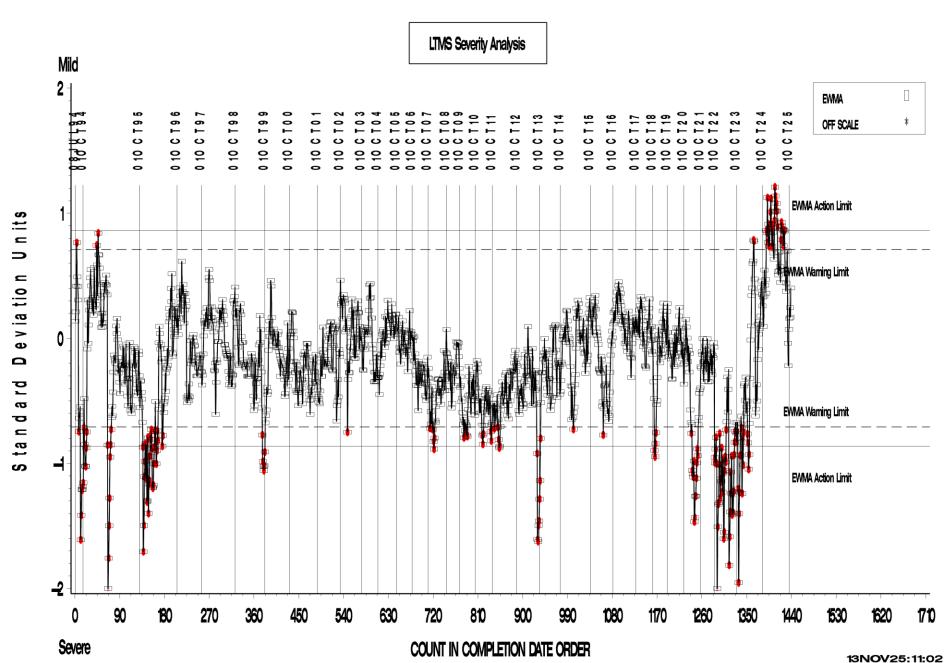


REF. FINAL AVERAGE CARBON/ VARNISH



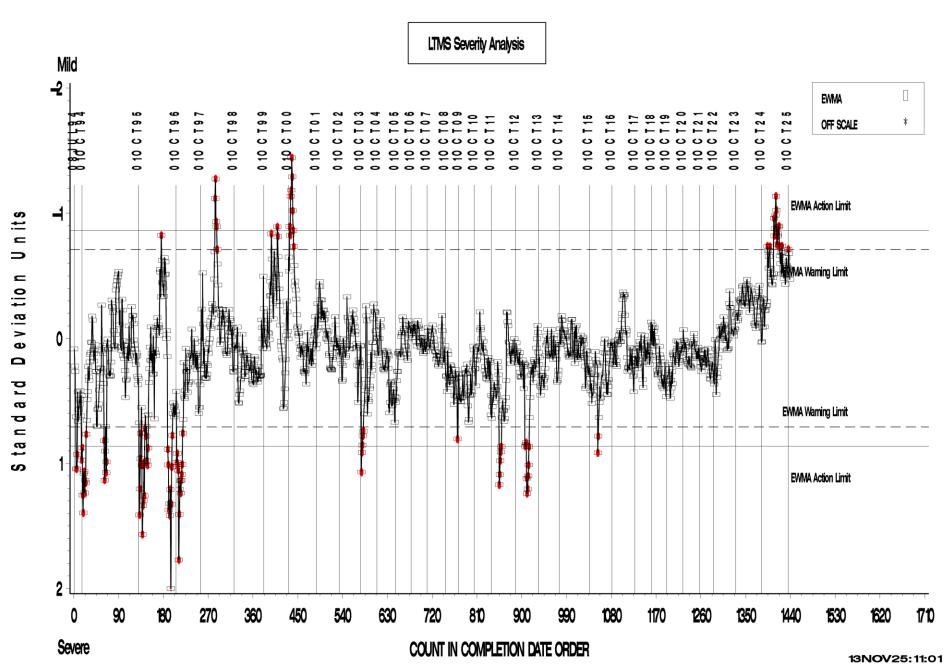


REF. FINAL AVERAGE SLUDGE



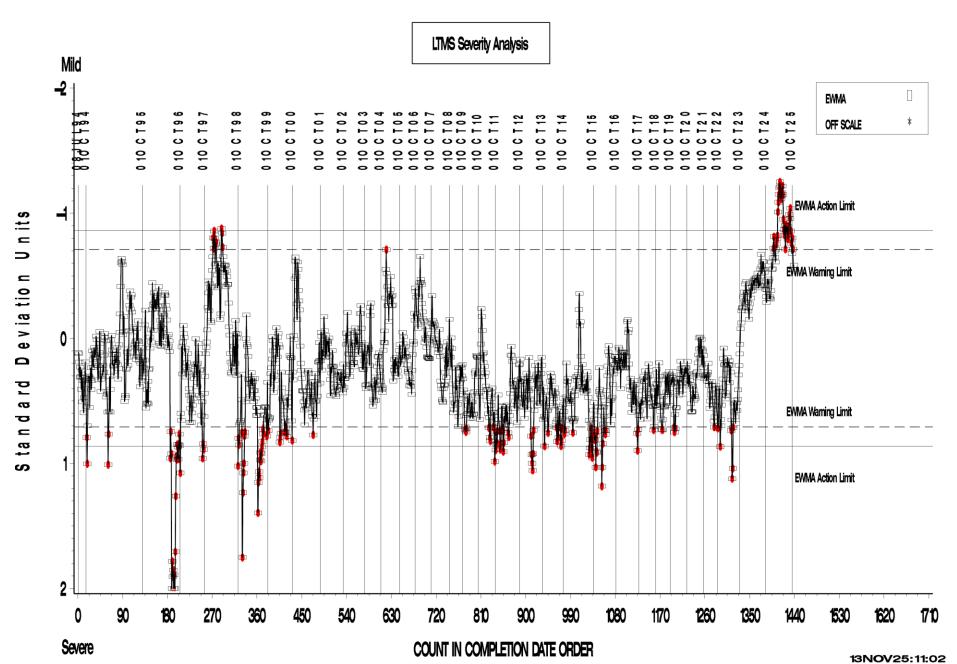
A Program of ASTM International

REF. FINAL PENTANE INSOLUBLES

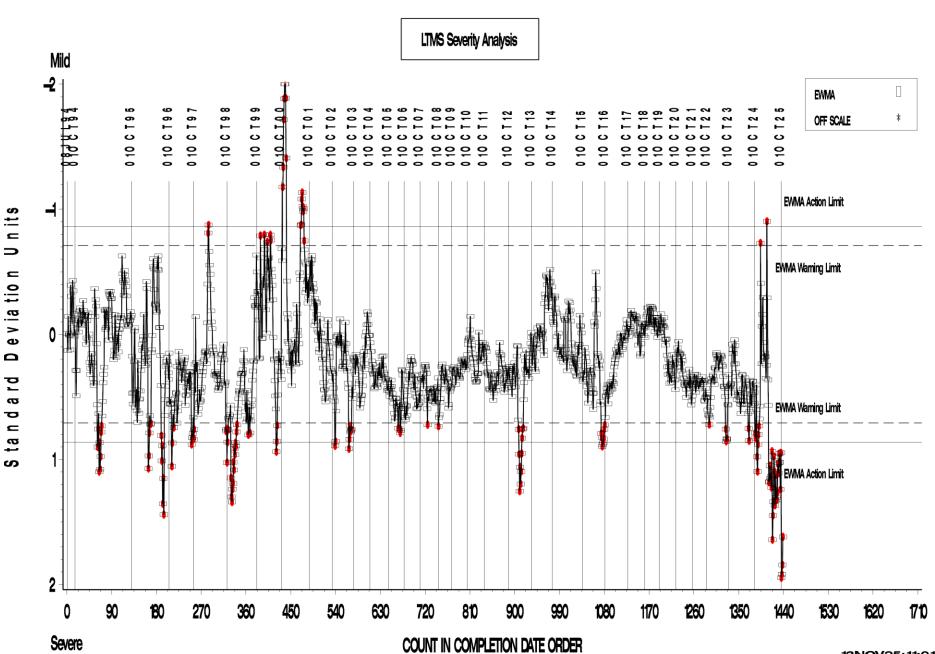


FINC

REF. FINAL TOLUENE INSOLUBLES

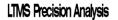


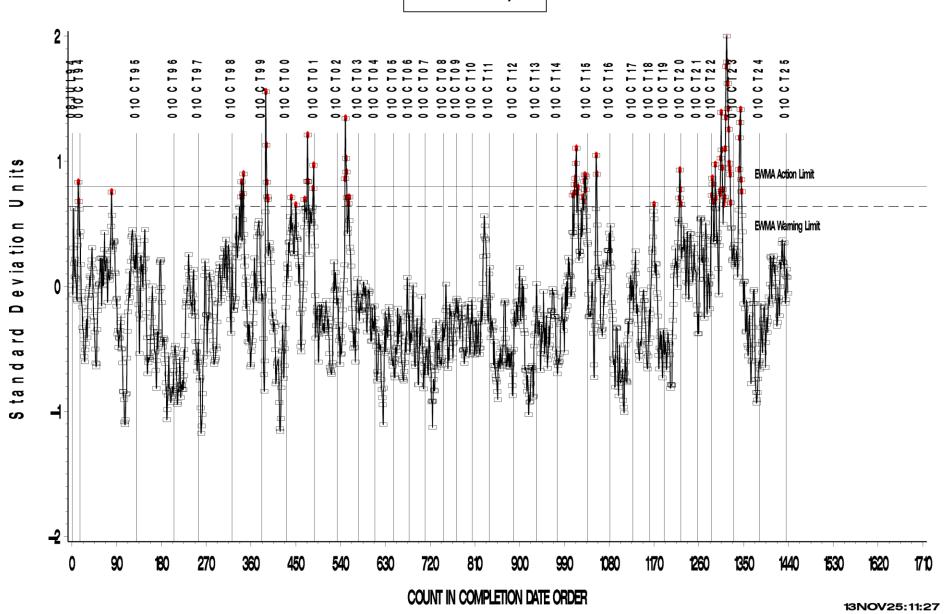
REF. FINAL VISCOSITY INCREASE





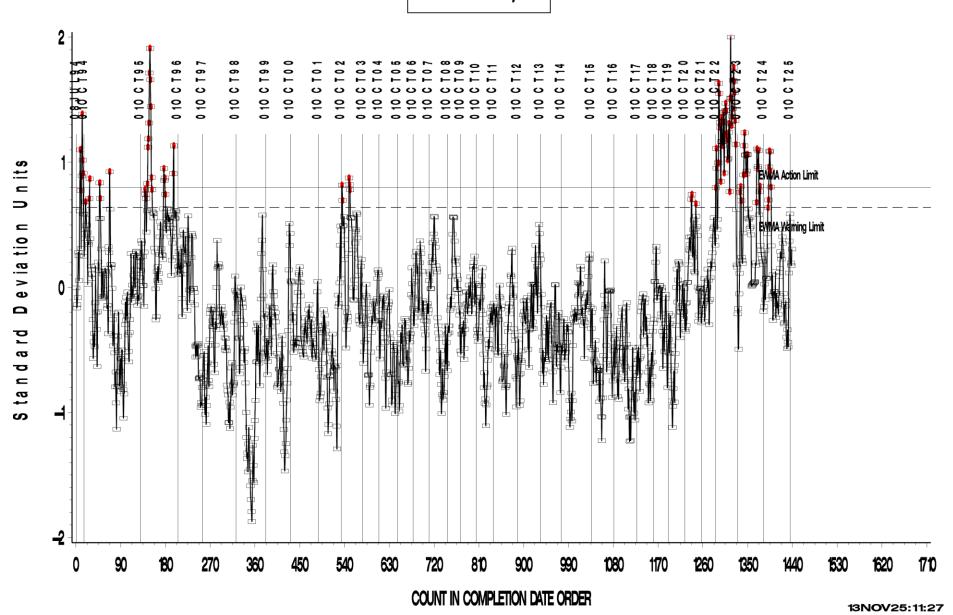
REF. FINAL AVERAGE CARBON/ VARNISH





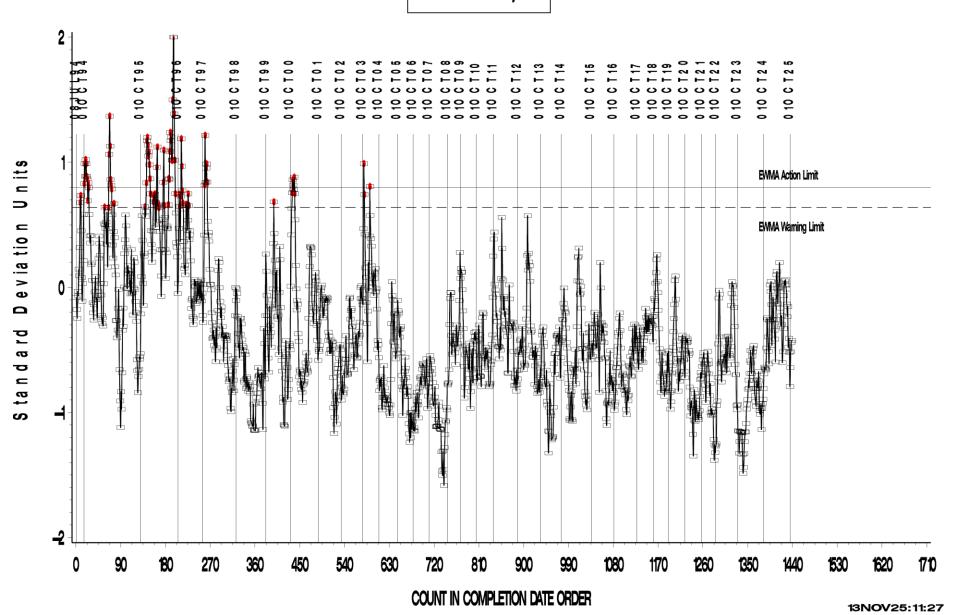


REF. FINAL AVERAGE SLUDGE



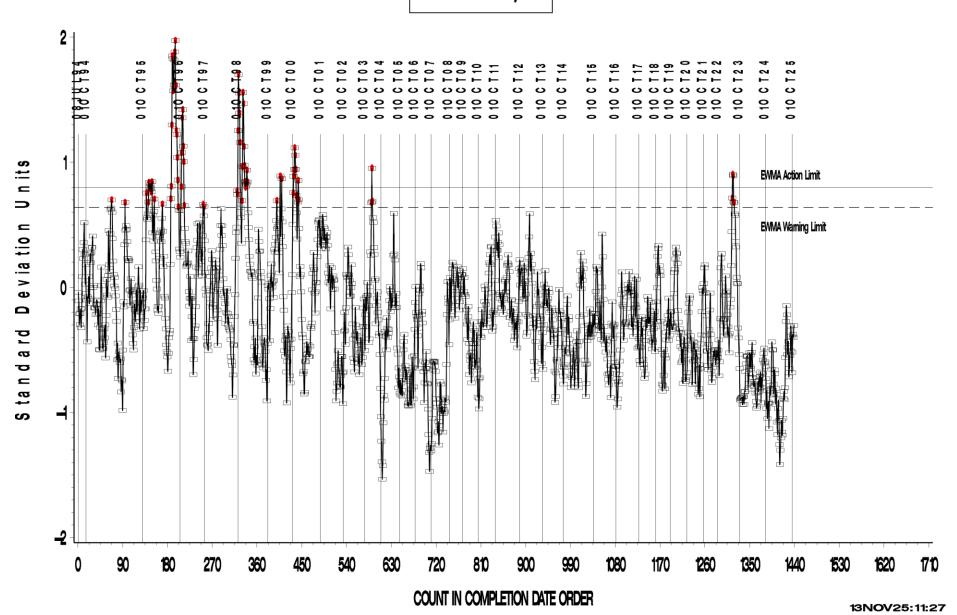


REF. FINAL PENTANE INSOLUBLES



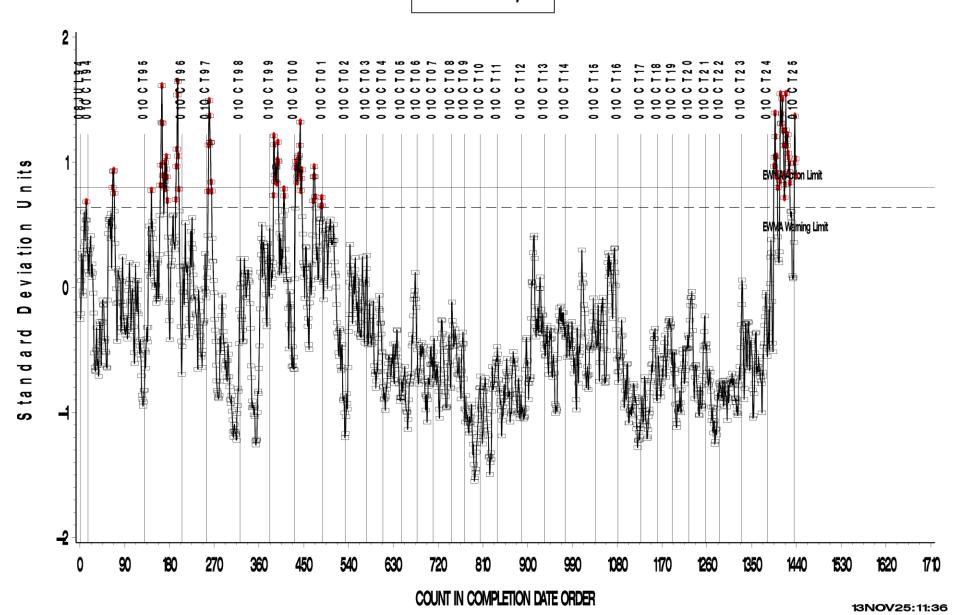


REF. FINAL TOLUENE INSOLUBLES



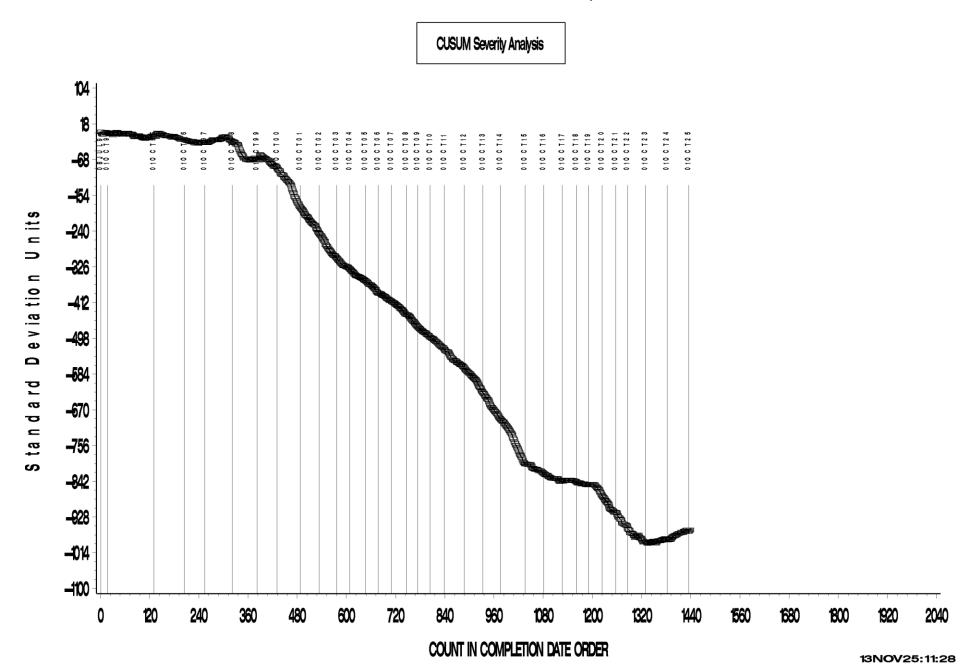


REF. FINAL VISCOSITY INCREASE





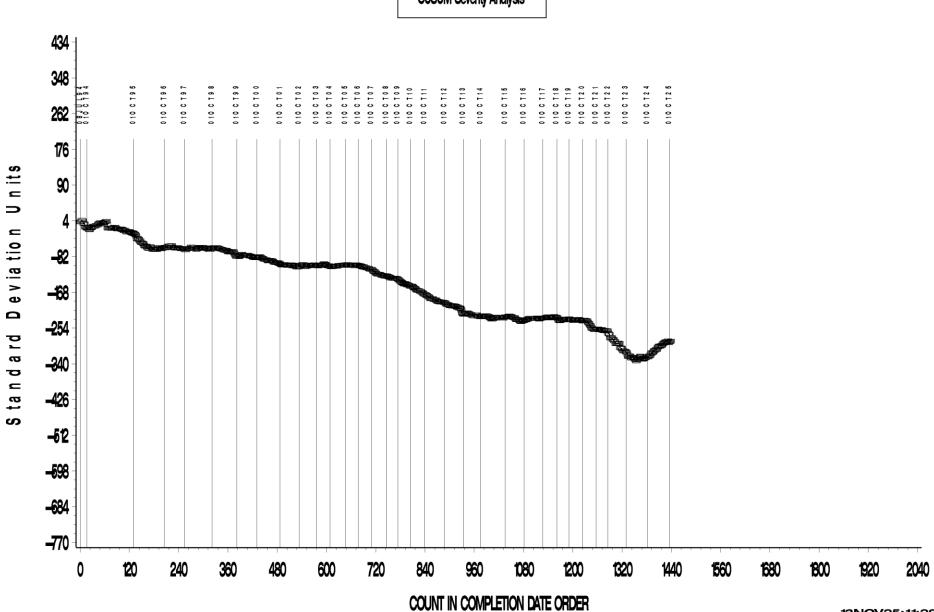
REF. FINAL AVERAGE CARBON/ VARNISH





REF. FINAL AVERAGE SLUDGE



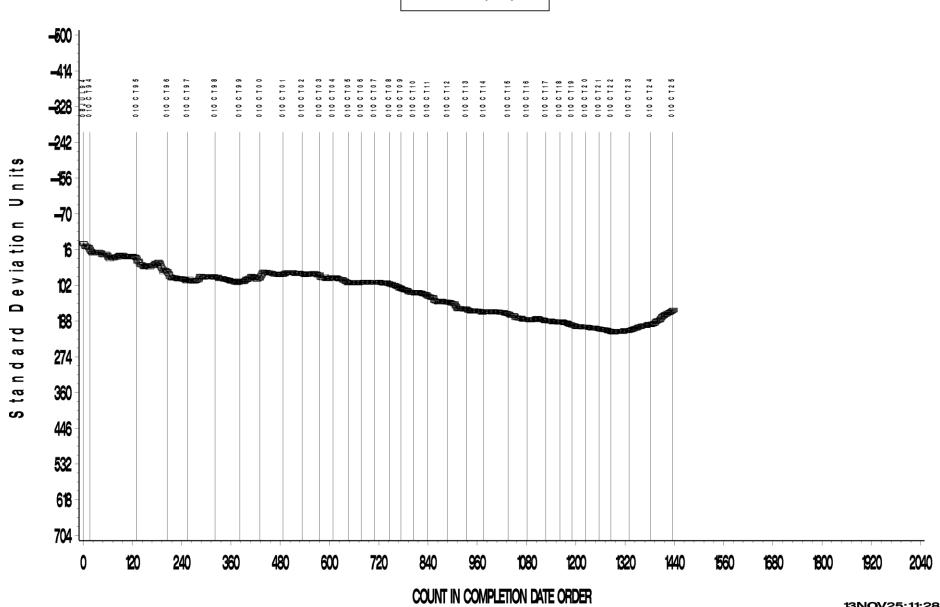


13NOV25:11:28



REF. FINAL PENTANE INSOLUBLES





13NOV25:11:28



REF. FINAL TOLUENE INSOLUBLES

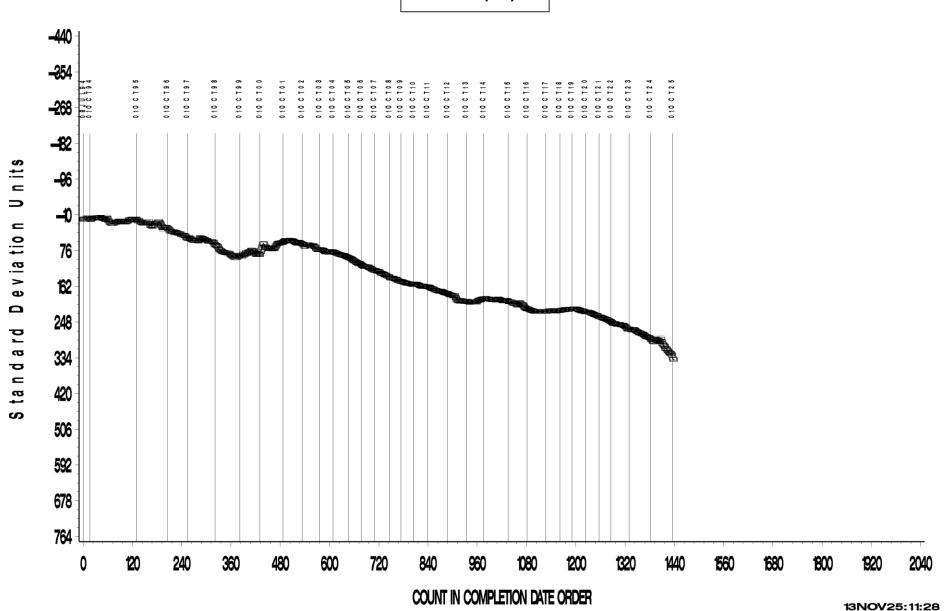






REF. FINAL VISCOSITY INCREASE

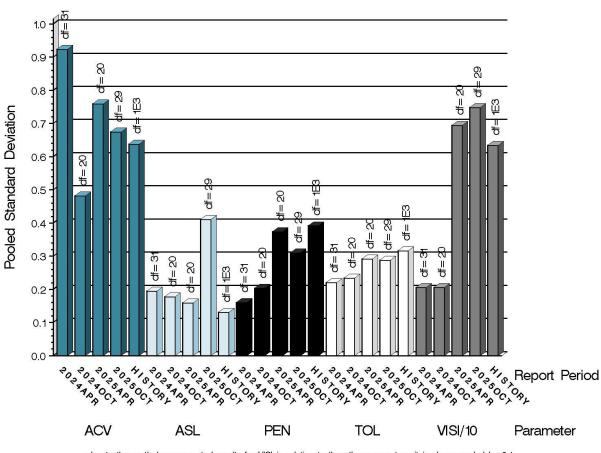




L-60-1 Precision Estimates

TEST PRECISION

POOLED STANDARD DEVIATION
BY SIX-MONTH ASTM REPORT PERIOD



due to the vastly larger reported results for VISI in relation to the other parameters, it is shown scaled by 0.1

10:43:58 13NOV2025



Information Letters



October 2025



Information Letters*

Test	Date	IL	Topic
L-60-1	20250728	25-1	Updated requirements for air flow controller and calibration flow meter

Return to Table of Contents



^{*}Available from TMC Website

Reference Oil Inventory



Actions, Re-blends, Inventories and Estimated Life



Reference Oil Re-blends & Replacements

>TMC 172, 170-1, & 171-1 (OSCT Testing)

• TMC reference oil 172 is a replacement oil for 169. TMC 170-1 is a reblend of reference oil 170. TMC 171-1 is a reblend of 171. 171-1 has been approved by the OSCT panel for test use. Approval matrixes are underway for 170-1 and 172.



Reference Oil Re-blends & Replacements Cont.

>TMC 117 (L42 Testing)

• The panel is searching for a replacement oil for reference oil 117 for L42 reference testing. Interested parties should approach the TMC.



Reference Oil Inventory Estimated Life

<u>Oil</u>	<u>Tests</u>	Year 🔻	Blend Quanti 🕶	TMC Invento	Estimated Li	Comment
117	L-42	2013	550	202.5	6 years	A request has been put out to the panel for a replacement oil for 117
126	L-33-1	2022	105	44.3	5 years	
	L-33-1, L-37-1, L-60-1,					
155-1	HTCT, OSCT	2010	495	27.14	1.5 years	No longer in test use
	L-33-1, L-37-1, L-60-1,					
155-2	HTCT, OSCT	2020	265	173	5 years	
134-1	L-37-1	2015	220	80	5 years	
152-2	L-37-1	2009	275	19.3	>2 year	
119	L-42	2018	54	7.2	1 year	No longer in test use
119-1	L-42	2024	54	38.5	5 years	Approved by panel Nov 2024
145	L-60-1	2024	48	45.3	5 years	Replacement for 148-1. Approved for test use
169	OSCT	2010	275	102.5	5 years	
170	OSCT	2015	52	18	2 years	
171	OSCT	2017	53	0	0 years	TMC inventory has been depleted.
172	OSCT	2024	103	105	7 years	Replacement for 169. Not yet approved by panel for test use
170-1	OSCT	2024	51.5	49.1	7 years	Reblend of 170. Not yet approved by panel for test use
171-1	OSCT	2024	54	48.4	5 years	Reblend of 171. Approved for test use



LTMS Deviations

April 1, 2025 – September 30, 2025



LTMS Deviations

No LTMS Deviations this period



TMC Laboratory Visits



>>> April 1, 2025 – September 30, 2025



TMC Lab Visits

Test	Number of Labs Visited
OSCT	0
L-33-1	0
L-37-1	0
L-42	0
L-60-1	0

No lab visits conducted during this reporting period.



Test Area Timelines



>>> April 1, 2025 – September 30, 2025



Test Area Timeline Additions*

Test	Date	Topic	IL
L-60-1	20250728	Updated requirements for air flow controller and calibration flow meter	25-1
L-33-1	20250922	Fields added to L-33-1 report form for oven fan speed percent deviation calculations	L331-20250829
L-37-1	20250818	2024 uncoated hardware batch approved for test use	TMC Memo 25-018
L-42	20250918	P2AD8 hardware batch approved for test use	TMC Memo 25-021
OSCT	20250911	Reference oil 171–1 introduction	TMC Memo 25-019



Rating Workshop Data



>>> July 2025 Gear Rating Workshop



Rating Workshop Data

- Gear rating workshop data can be found on the TMC website:
 - https://www.astmtmc.org/ftp/refdata/gear/rating_workshop_data/



Miscellaneous Information

- Available on TMC Website:
 - Live Reference Test Data Bases
 - Surveillance Panel Meeting Minutes
 - Test Area Alarm Logs
 - Complete Test Area Timelines
 - LTMS Manual
- https://www.astmtmc.org

Return to Table of Contents



