

LDEOC/EOEC SURVEILLANCE PANEL

A LDEOC/EOEC conference call was held on 7-1-21, at 9 am Central Standard Time. The following esteemed members were on the call:

Joe Franklin - Intertek
Mike Birke – SwRI
Doyle Boese – Infineum
Vince Donndelinger - Lubrizol
Robert Stockwell – Oronite
Becky Grinfield – SwRI
Kai Malyska - ISP
Tom Schofield – TMC
Gefei Wu – Valvoline
Kimberly Gutierrez - Intertek
Conika Owen-Robinson – Savant
Maggie Smerdon - Savant
Dennis Gaal – ExxonMobil
Jason Bowden - OHT

The purpose of the call was to discuss/approve adopting an Industry Correction Factor (ICF) for D7216 EOEC Nitrile volume swell. Doyle Boese made a presentation (attached), and based on the results of his statistical analysis, recommended an ICF of -1.82. As shown in the presentation, volume swell has been trending severe since batch 8, with some batch 27 results causing labs to fail. He also did not recommend adopting an ICF for any of the other properties. Instead of moving the reference oil targets, the use of an ICF is recommended because it will also correct the candidate oil results. Tom Schofield of TMC stated that some labs are using oil 1006-1, and 1006-2, and wanted to know if he should assign only SL107 for EOECN, similar to what the panel is doing for EOECN. Doyle replied that was not necessary, as the ICF applies to all three reference oils. Vince Donndelinger made a comment that based on Doyle's December 2019 statistical analysis (presentation attached), oil SL107 causes less swell than oil 1006-2, and that consideration should be given to applying a smaller correction factor of -1.26 and change the target for SL107 to 0.48. The combination would have the same impact on SL107 as the proposed ICF of -1.82 but have a lesser impact on candidate results as an ICF -1.82 may overcorrect some oils. The 0.48 was calculated assuming the impact of the batch shift was proportional to the oil volume swell severity. Doyle responded that based on the limited data, the -1.82 is appropriate. There was no further discussion. Joe Franklin made a motion to adopt an ICF of -1.82 to EOEC nitrile volume swell results. Doyle Boese voiced a second to the motion. Robert Stockwell asked to see the 1006-2 batch 27 data, however no labs have submitted any data. Chances are none will be submitted, as the labs who are still using 1006-2 are most likely on previous batches. Jason Bowden stated that there was no change in process in the nitrile production between batches 7 and 8, which occurred around 2005-6. No meeting minutes are available on the TMC website for that period of time either. Jason suggested that perhaps the original targets were off, since from batch 8 on, the data seems to stabilize. Doyle was wondering if there was a possibility that the manufacturing process improved. Mike Birke stated that in the past, there was a technical reason, such as an ingredient or process change, that was the reason an ICF was adopted. For EOEC nitrile, there is no such reason. Since prior to batch 27, lab have been passing the reference, although on the severe side, no action had been taken by the SP. It was not until batch 27 that a more focused statistical look was given to volume swell, and it was then that it was apparent that batches 1-7 showed significantly different swell than batches 8 and on, suggesting the original targets were incorrect. Tom asked how the information letter should be worded, and Joe Franklin suggested "By Surveillance Panel approval, statistical evidence was examined and an ICF is recommended". Dennis Gaal asked the question, in reference to Vince's comment of 1006 causing more swell than SL107, if the 1006 oils could be obsolete. Doyle made a comment that the data shows batch 23 through 26 show a consistent change

between reference oil 1006-2 and SL107 results. If the impact were proportional to swell severity the differences between the means of the two oils would be larger for batches with higher means. Therefore, Vince's assumption of proportionality of impact to volume swell is not observed in the means of these oils for Batches 23 to 26. Vince found the argument compelling. In the end the motion was approved with 11 members voting affirmative, zero members voting negative, and three members abstaining. The abstentions were from Tom Schofield, Robert Stockwell, and Jason Bowden. The verbiage on the information letter will recognize the need to institute date and batch requirements. Specifically, an ICF of -1.82 will be applied to EOEEN volume swell results of batches 8 and higher, with an effective date of July 15, 2021. A question was raised on whether the motion needs to go to ballot first, however no members stated they would vote negative. Jason Bowden made a quick announcement that batch 25 LDEOC ACM1 will be sent out to labs for screening. Mike Birke will send out an email to participating labs with testing protocol. The results will be used in determining an ICF for volume swell.

There were no other comments, and the meeting adjourned at 10:07 am.

EOEC Nitrile % Volume Change Severity Shift

D. Boese

June 24, 2021

Performance you can rely on.



Based on EOEC Nitrile data through June 17, 2021:

- Recommend an Industry Correction Factor (ICF) for % Volume Change of -1.82.
- Recommend against ICFs for remaining Nitrile parameters (Hardness Change, % Tensile Change and % Elongation Change).

SL107 EOECN Targets

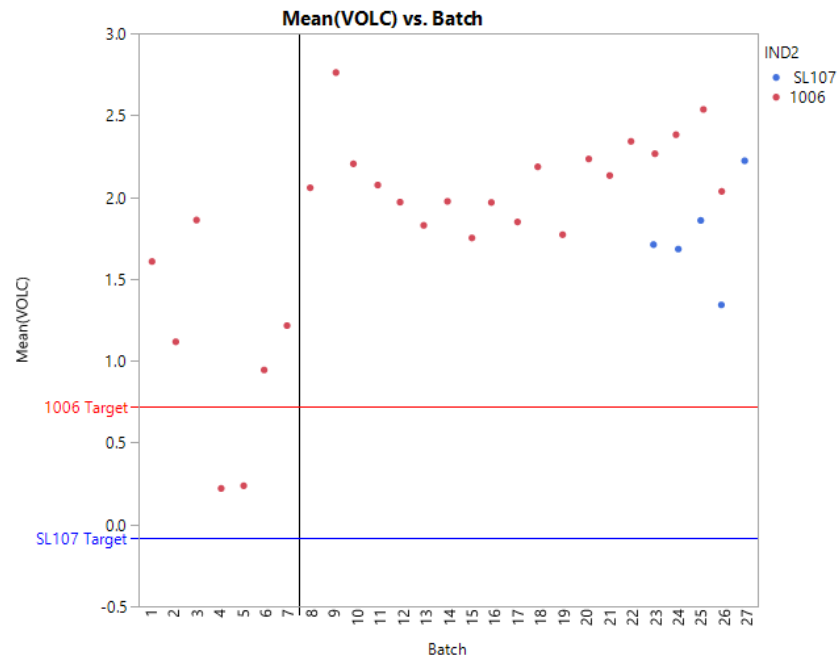


- Below is Round Robin summary of EOECN results used to set SL107 targets (means).
- An industry offset for VOLC of -1.82 was estimated.
 - This industry offset is an estimate of the amount shifted since the 1006 targets were established.

EOEC Nitrile (EOECN)

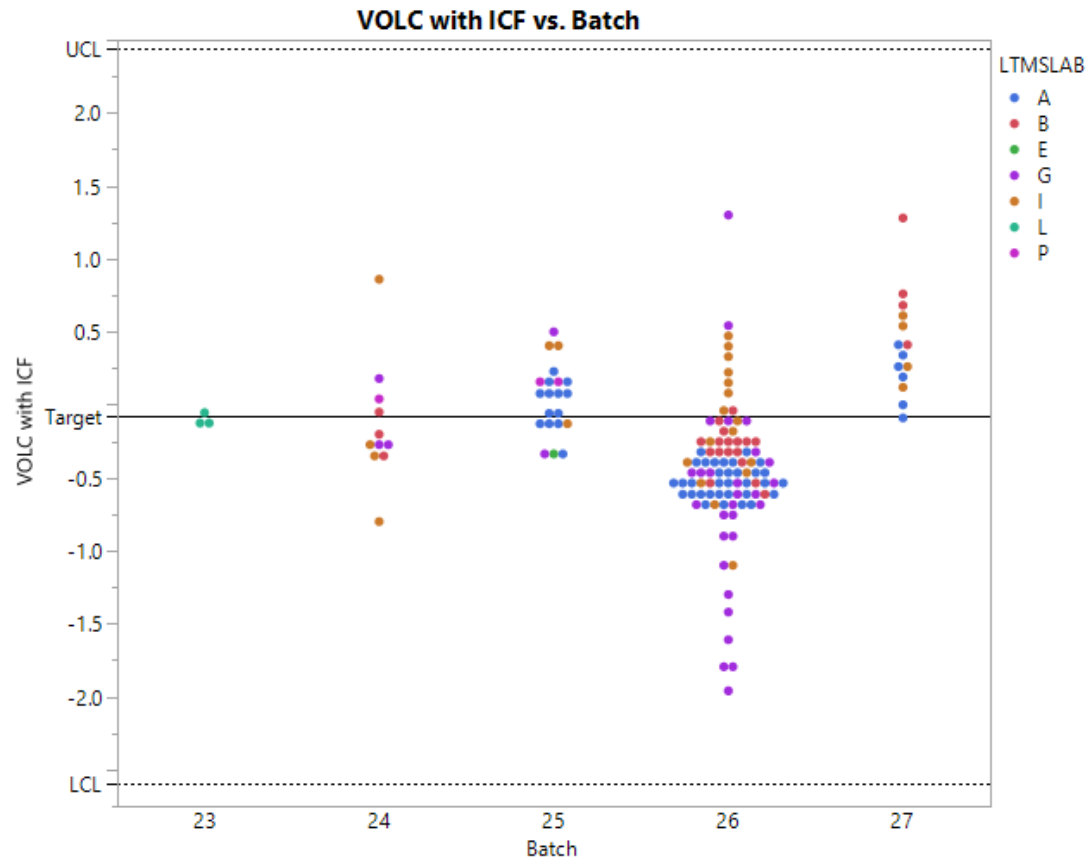
Parameter	1006 Targets		Sample Size	Round Robin Means		1006 Offset	SL107	
	Mean	Std Dev		1006	SL107		Target (Mean)	Std Dev
VOLC	0.72	0.84	18	2.54	1.74	-1.82	-0.08	0.33
HARD	1.67	1.77	18	2.95	3.11	-1.28	1.83	1.41
TENS	-27.47	7.33	18	-36.08	-5.80	8.61	2.80	5.22
ELON	-50.86	6.72	18	-52.23	-35.07	1.37	-33.69	4.29

VOLC Severity Shift



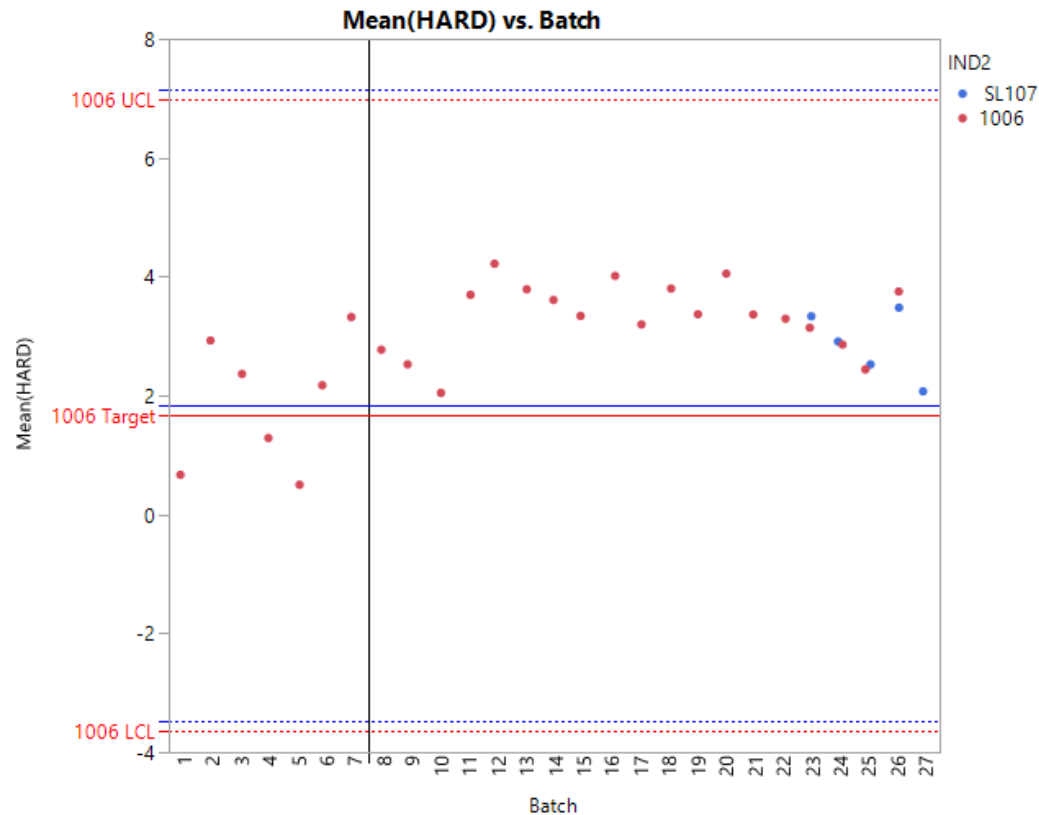
- There appears to have been a shift in severity between Batches 7 and 8.
- Since Batch 8, the severity has remained consistent within batch-to-batch variation.
- The industry offset of -1.82 is an estimate of the severity shift since Batch 7.
- This severity shift likely also impacts candidate results (EOECN VOLC has fixed limits).
- The severity shift should be corrected via an ICF as it would also be applied to candidates.

SL107 EOECN VOLC with ICF (-1.82)



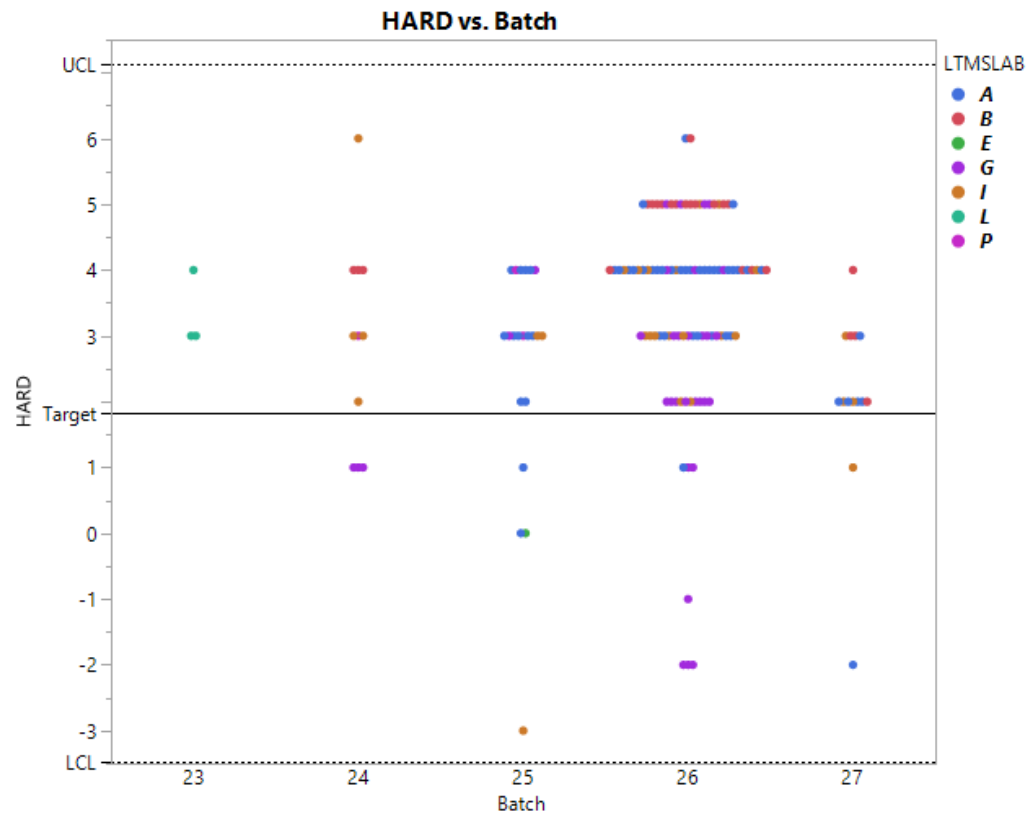
- Utilizing the Industry Shift (-1.82) from the Round Robin as the ICF all SL107 EOECN VOLC results are well within the Calibration Limits.

EOECN Hardness Change Means by Batch



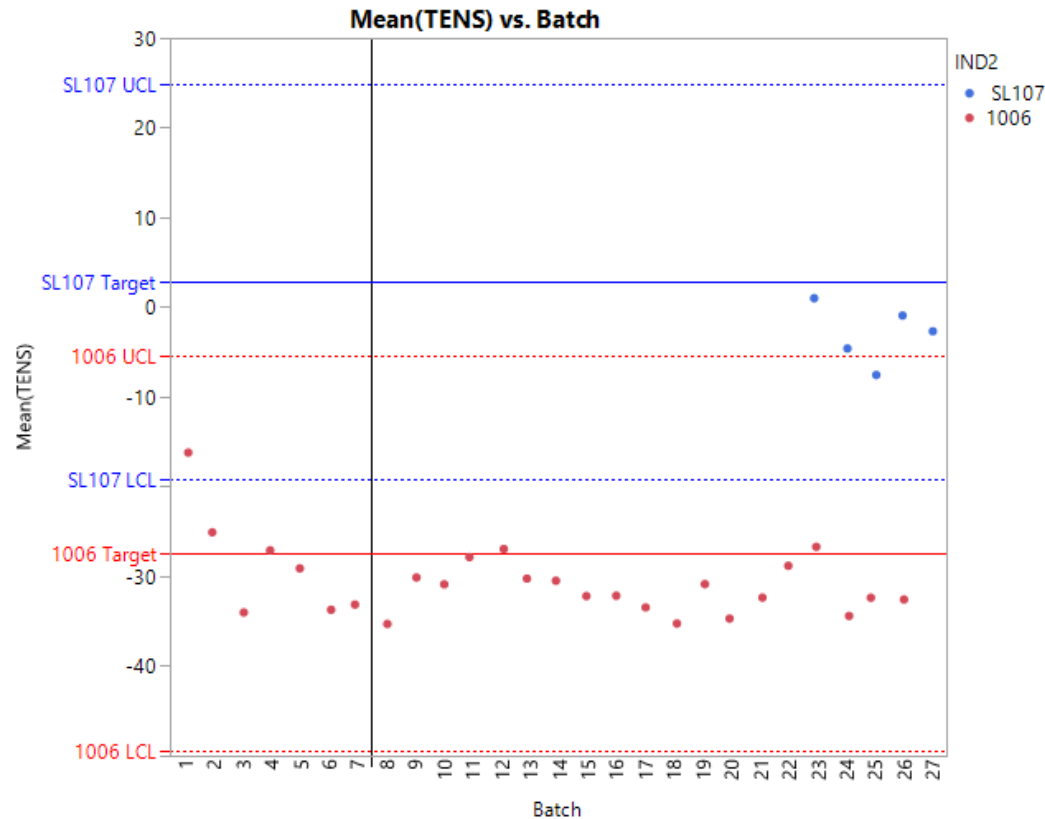
- A similar shift appears to have occurred for Hardness Change though possibly a few batches later and means are approximately only 1 standard deviation from target.
- Recommend against an ICF for Hardness Change.

SL107 EOECN Hardness Change



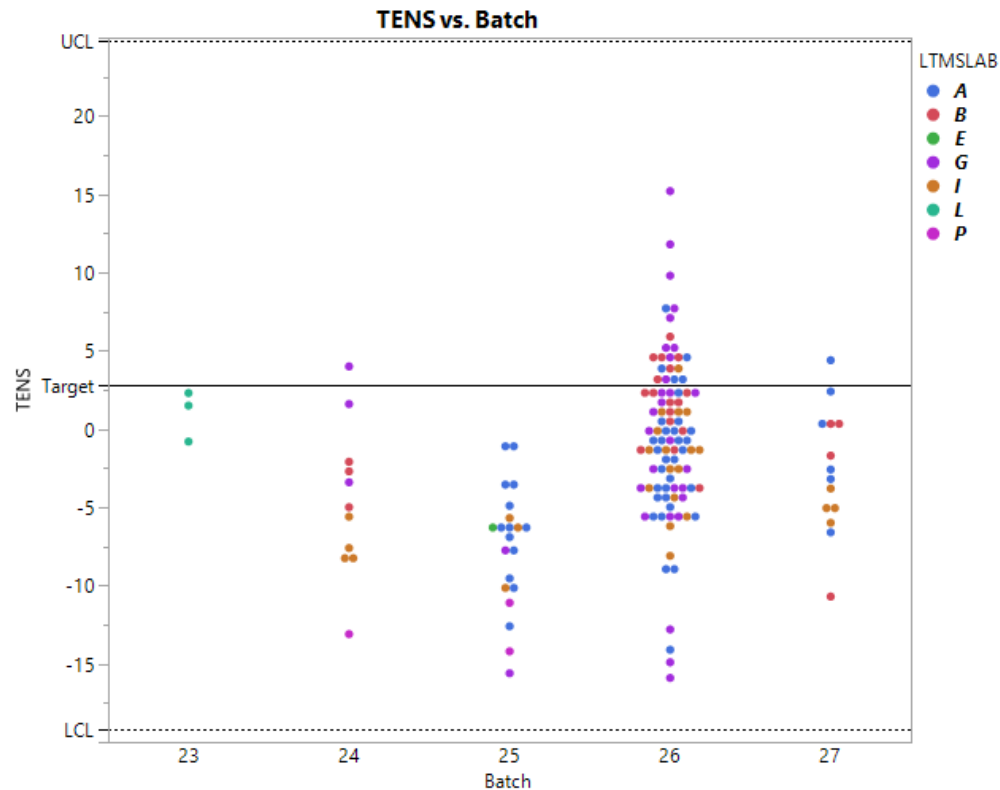
- All SL107 EOECN Hardness Change are within calibration limits.

EOECN % Tensile Change Means by Batch



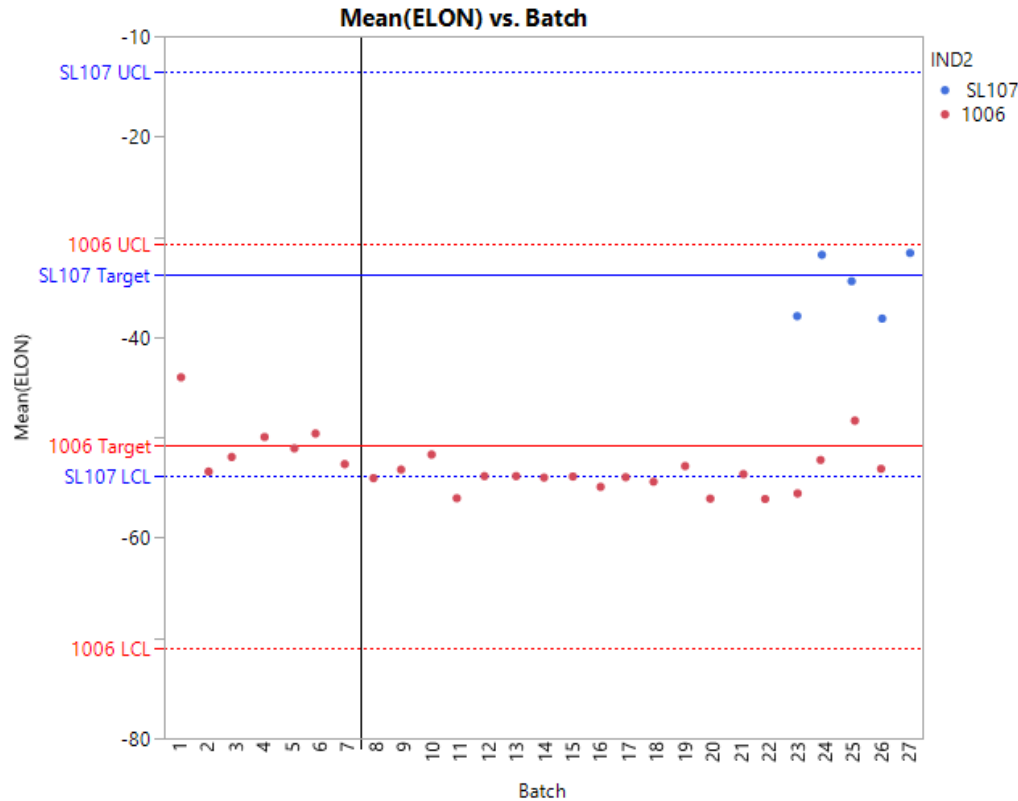
- There is no obvious shift in severity between Batches 7 and 8.
- Most means are slightly below target but within a standard deviation.
- Recommend against an ICF for % Tensile Change.

SL107 % EOECN Elongation Change



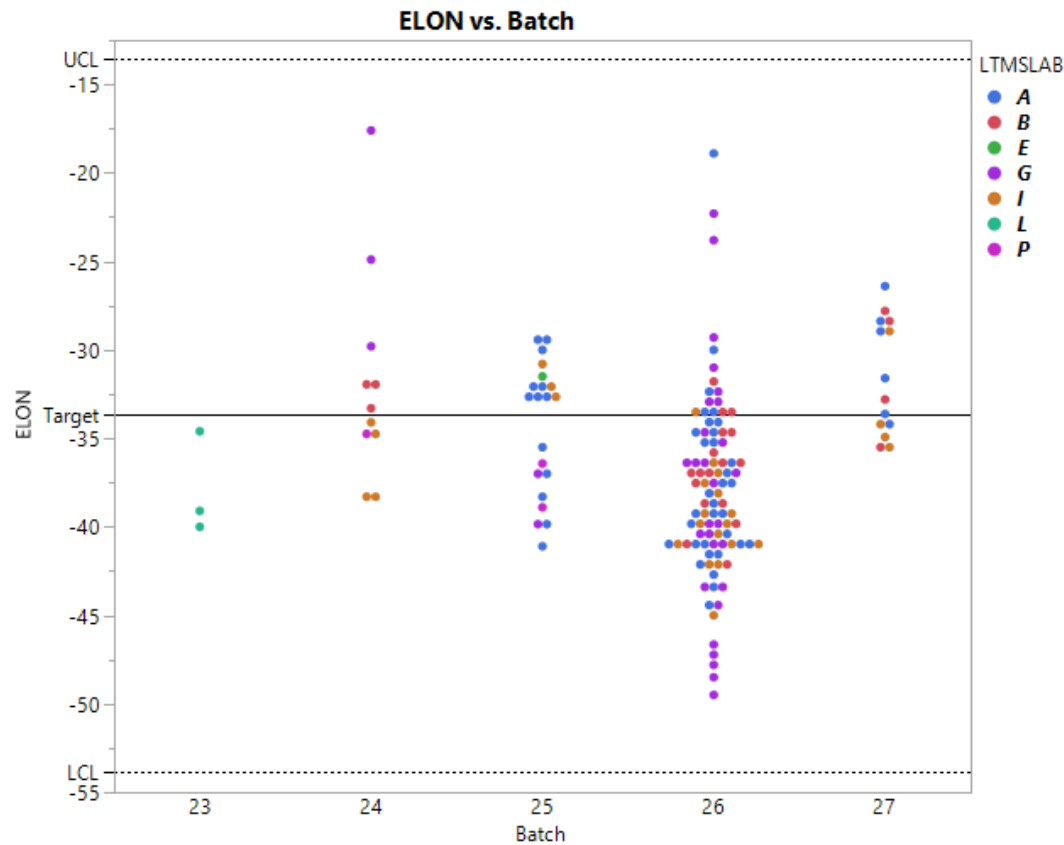
- All SL107 EOECN % Elongation Change results are within calibration limits though tend to be below target.

EOECN % Elongation Change Means by Batch



- There appears to be a small shift in severity after Batch 7 of approximately a half of a standard deviation.
- All Batch means are well within a standard deviation of the target.
- Recommend against an ICF for % Elongation Change.

SL107 % Elongation Change



- All SL107 % Elongation Change results are within the calibration limits with Batch means bouncing above and below target.

Permission is given for storage of one copy in electronic means for reference purposes. Further reproduction of any material is prohibited without prior written consent of Infineum International Limited.

The information contained in this document is based upon data believed to be reliable at the time of going to press and relates only to the matters specifically mentioned in this document. Although Infineum has used reasonable skill and care in the preparation of this information, in the absence of any overriding obligations arising under a specific contract, no representation, warranty (express or implied), or guarantee is made as to the suitability, accuracy, reliability or completeness of the information; nothing in this document shall reduce the user's responsibility to satisfy itself as to the suitability, accuracy, reliability, and completeness of such information for its particular use; there is no warranty against intellectual property infringement; and Infineum shall not be liable for any loss, damage or injury that may occur from the use of this information other than death or personal injury caused by its negligence. No statement shall be construed as an endorsement of any product or process. For greater certainty, before use of information contained in this document, particularly if the product is used for a purpose or under conditions which are abnormal or not reasonably foreseeable, this information must be reviewed with the supplier of such information.

Links to third party websites from this document are provided solely for your convenience. Infineum does not control and is not responsible for the content of those third party websites. If you decide to access any of those websites, you do so entirely at your own risk. Please also refer to our Privacy Policy.

'INFINEUM', the interlocking Ripple Device, the corporate mark comprising INFINEUM and the interlocking Ripple Device and 润英联 are trademarks of Infineum International Limited.

© 2020 Infineum International Limited. All rights reserved.