



Test Monitoring Center

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LDEOC Batch 8 Elastomer

Review of Donated Tests and
Overall Industry Performance to
date in LDEOC

Review of Industry Performance

- All Valid Reference Oil Data included in the analysis, plus all valid donated runs on Batch 8 elastomers.
- Data analyzed for factors affecting test severity
 - Elastomer Batch
 - Laboratory
 - Laboratory-Elastomer Batch interactions

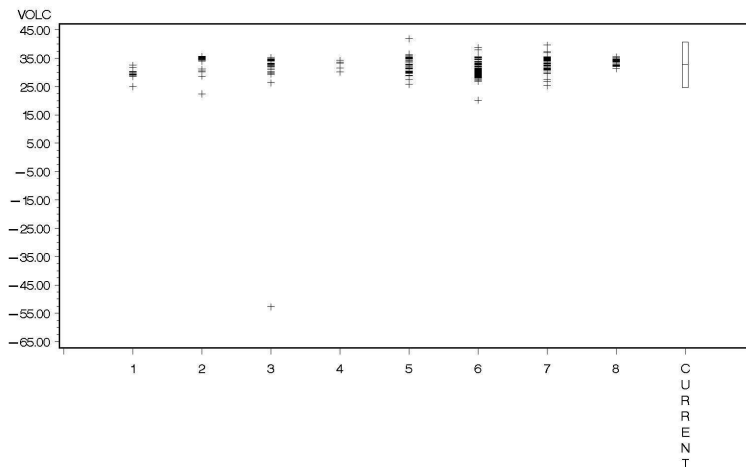


Results of Analysis

- Some significant elastomer batch differences were identified.
- Some significant **laboratory** differences were identified.

LDEOC Silicone Average Percent Volume Change All Valid Reference Data and All Valid Batch 8 Runs

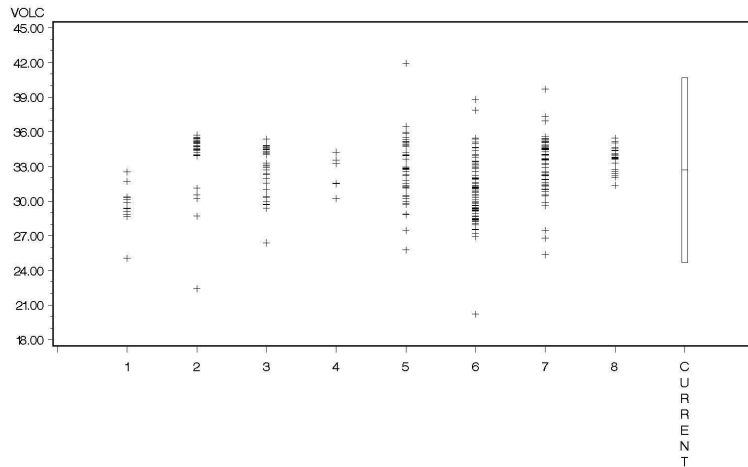
Plotted by Elastomer Batch



LDEOC Silicone Average Percent Volume Change

All Valid Reference Data and All Valid Batch 8 Runs

Plotted by Elastomer Batch (One Data Point off-scale, Batch 9)



SPECIAL

6/25/2012

5

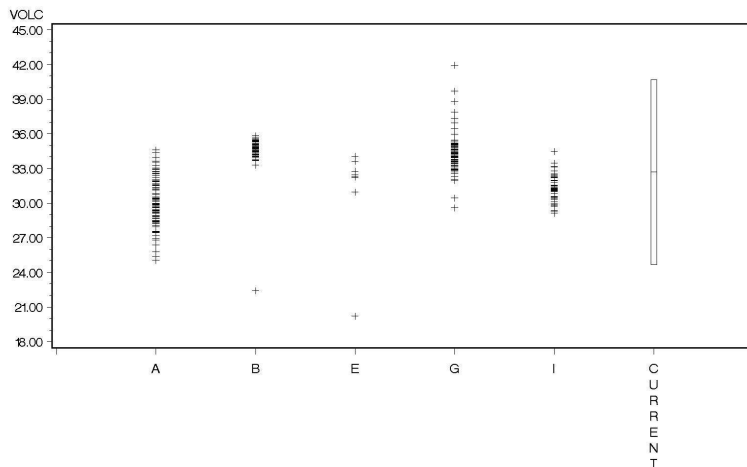
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LDEOC Silicone Average Percent Volume Change

All Valid Reference Data and All Valid Batch 8 Runs

Plotted by Lab (One Data Point off-scale, Lab G)



LTMSLAB

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6

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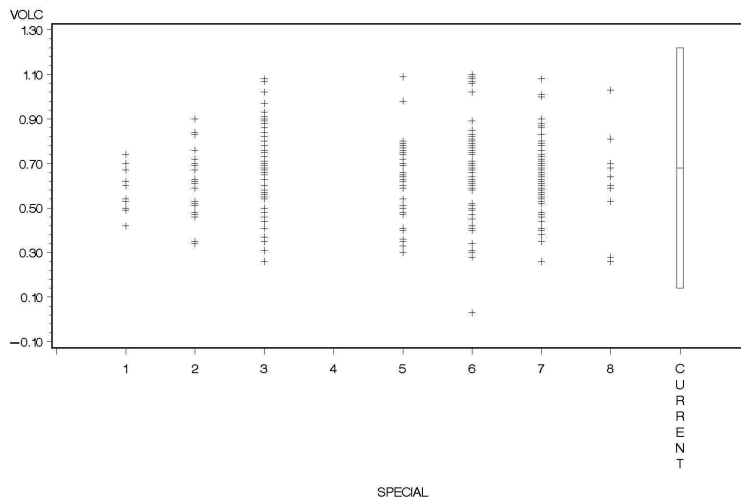


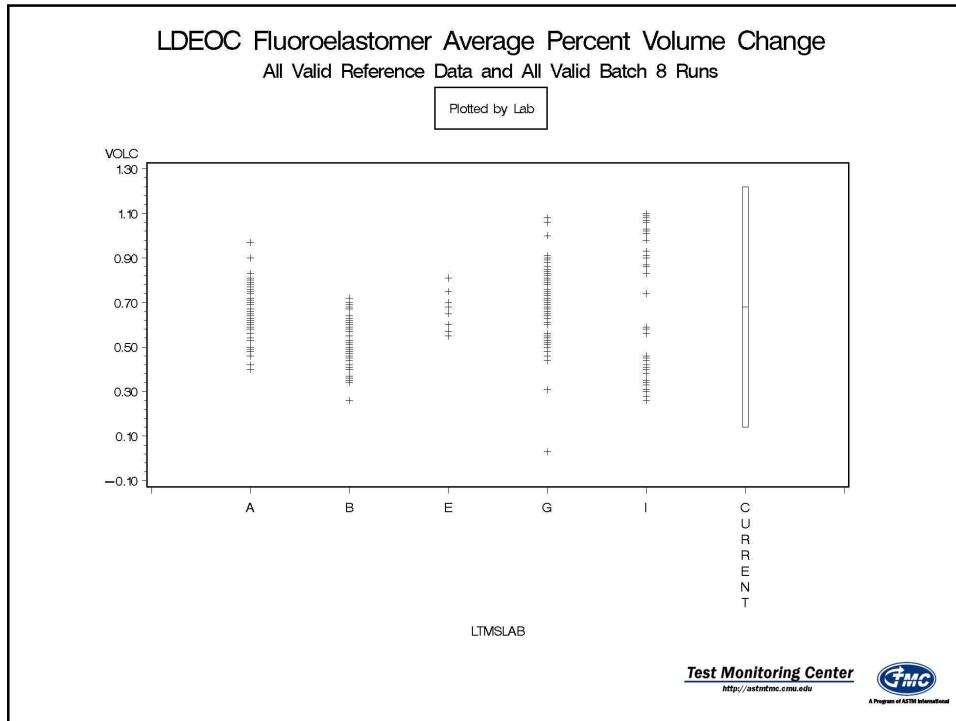
LDEOCS – Volume Change

- Some significant batch differences exist
 - Batch 1 is different than Batches 2 & 7
 - Batch 2 is different than Batches 3 & 6
- Some significant lab differences also exist
 - Lab A is different than Labs B & G
 - Lab B is different than Lab I

LDEOC Fluoroelastomer Average Percent Volume Change All Valid Reference Data and All Valid Batch 8 Runs

Plotted by Elastomer Batch



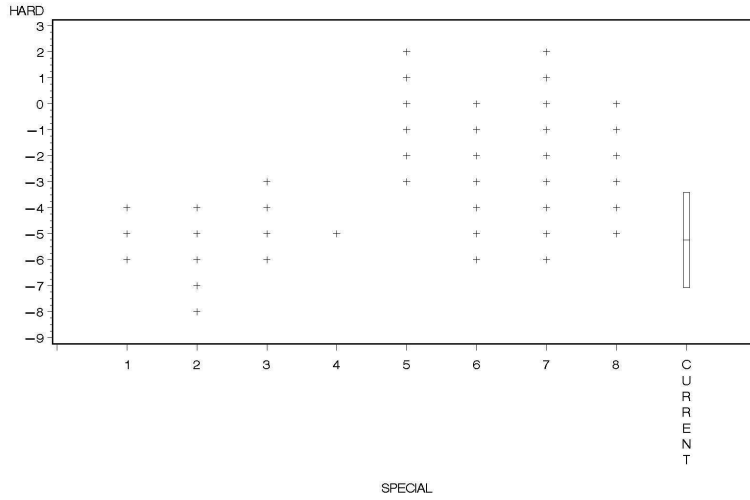


LDEOCF – Volume Change

- No significant batch differences exist
- Significant lab differences DO exist
 - Lab A is different than Lab B
 - Lab B is different than Labs G & I

LDEOC Polyacrylate Average Shore A Hardness Change All Valid Reference Data and All Valid Batch 8 Runs

Plotted by Elastomer Batch

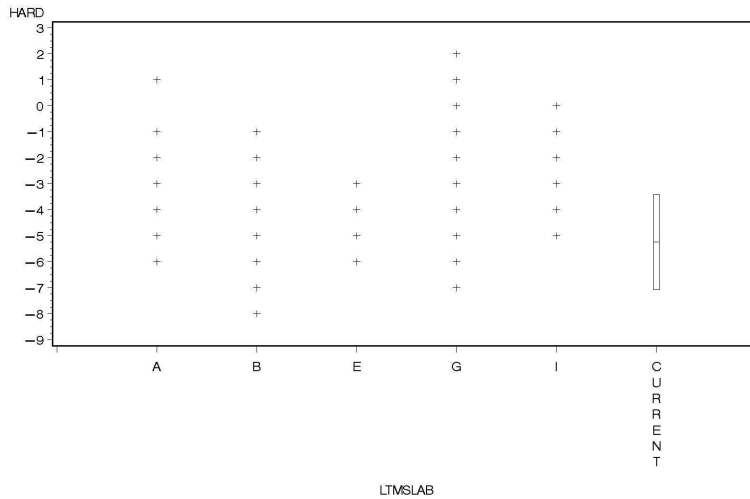


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LDEOC Polyacrylate Average Shore A Hardness Change All Valid Reference Data and All Valid Batch 8 Runs

Plotted by Lab



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LDEOCP – Hardness Change

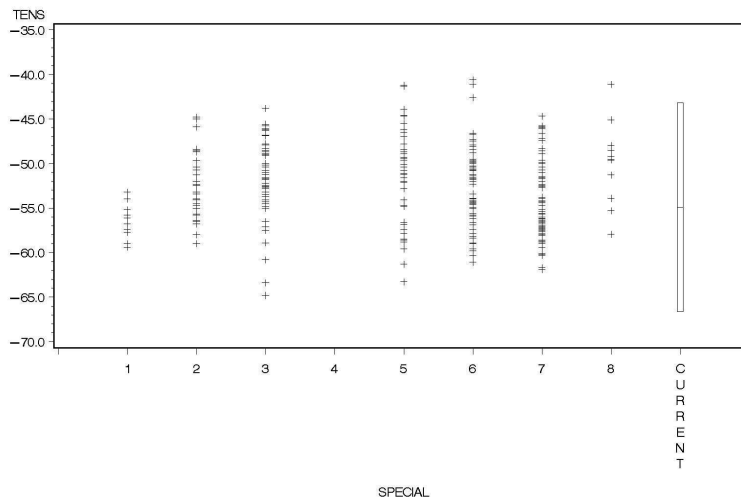
- Some significant batch differences exist
 - Batch 1 is different than Batches 5, 6, 7, & 8
 - Batch 2 is different than Batches 5, 6, 7, & 8
 - Other Batch differences exist.
- Some significant lab differences also exist
 - Lab A is different than Labs B & G
 - Lab E is different than Lab G & I

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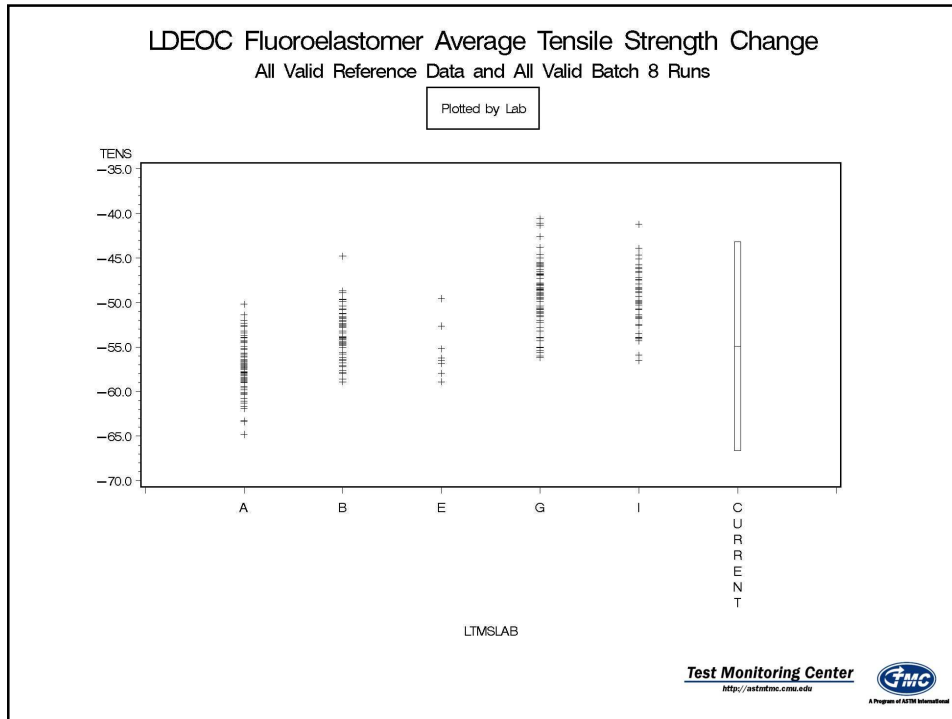
LDEOC Fluoroelastomer Average Tensile Strength Change All Valid Reference Data and All Valid Batch 8 Runs

Plotted by Elastomer Batch



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LDEOCF – Tensile Strength

- Some significant batch differences exist
 - Batch 1 is different than 2, 3, 5, 7, & 8
 - Other Batch differences exist.
- Some significant lab differences also exist
 - Lab A is different than Labs B, G, & I
 - Lab B is different than Lab G & I

Analysis Conclusions

- It is impossible to separate lab effects from batch effects, due to not all batches being run in all labs
- Lab appears to be a bigger driving factor in test severity than elastomer batch.
- It appears that any differences found in elastomer batch can be readily explained by differences in lab performance.

LDEOCA Data Distribution

	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5	Batch 6	Batch 7	Batch 8	Total
Lab A	8	2	0	13	11	33	15	2	84
Lab B	0	2	20	6	7	11	9	4	59
Lab E	0	0	1	0	1	2	3	2	9
Lab G	1	0	12	12	13	19	16	5	78
Lab I	0	0	0	12	8	17	9	2	48
Total	9	4	33	43	40	82	52	15	278

Solutions going Forward

- Setting test targets by elastomer batch is most likely not appropriate.
- Differences in laboratory performance need to be addressed by the Surveillance Panel.
- Any elastomer batch approval process must include all laboratories in the industry.

New Test Targets

- Establish new test targets for all elastomer types and batches (one set of targets per elastomer – no by-batch targets).
- Incorporate elastomer batch and laboratory into the model used to generate new test targets.
- Incorporate a K Value that is appropriate for reference oil testing.

New Targets, continued

- Use all available valid reference data in the model.
 - The same data set used for the analysis was used for generation of new test targets.
 - Model using General Linear Models

New “K Value” for Calibration

- Current “K Value” for calibration is 3.0
- Resulting “acceptance band” is six standard deviations wide.
- Six standard deviations account for 99.73% of all the data.
- By definition, the current calibration system rejects 27 tests out of 10,000.
- A “K Value” of 2.2 is used in the gear oil version of this test (OSCT, D 5662)

New LDEOCA Targets

	Mean	Standard Deviation
VOLC	25	0.68
HARD	-12.9	0.93
TENS	-15.52	3.55

New LDEOCF Targets

	Mean	Standard Deviation
VOLC	0.65	0.18
HARD	3.63	0.95
TENS	-52.87	2.91

New LDEOCN Targets

	Mean	Standard Deviation
VOLC	1.34	0.41
HARD	-1	0.84
TENS	-4.12	4.51

New LDEOCP Targets

	Mean	Standard Deviation
VOLC	3.16	0.43
HARD	-3.16	1.06
TENS	-2.59	8.64

New LDEOCS Targets

	Mean	Standard Deviation
VOLC	32.09	5.38
HARD	-21.51	1.11
TENS	-34.77	4.01

Background Information

- All analysis results will be attached to the minutes.
 - Plots of all parameters and elastomers, both by batch and by lab.
 - Data Distribution Tables for all elastomer types.
 - Results of statistical analyses, for all elastomer types.
 - Plots of all parameters and elastomers, by batch and by lab, showing proposed new targets.



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