

MACK-Volvo Surveillance Panel Meeting Notes

02/19/2021 @ 9:30 AM EST

Attendees

SwRI: Robert Warden, Isaac Leer, Travis Kostan, Jose Starling

Oronite: David Lee

Afton: Brent Calcut, Christian Porter, Todd Dvorak, Cory Koglin

Infineum: David Brass (Chair), Elisa Santos

Intertek: Garrett White (Secretary), Pablo Ramirez

Lubrizol: Jim Matasic

Haltermann: Prasad Tumati

Exxon Mobil: Paul Rubas, Steve Jetter

TMC: Sean Moyer

TEI: Derek Grosch

Ford: Michael Deegan

Volvo: Patrick Holmes

Agenda

- 1) Mack T-8 Alternative Fuel Supplier Document Vote
- 2) Volvo T-13 Parts (Cylinder Heads/Blocks)
- 3) Mack T-11 / T-12 Parts

Action Items and Key Points

- 1) Mack T-8 alternative fuel supplier criteria document approved by email ballot.
- 2) Volvo to meet next week internally to discuss issues surrounding engine blocks and cylinders head for the T-13.
- 3) SwRI to continue with the T-12 matrix of parts testing.
- 4) Intertek to re-run their T-11 reference with a new set of 6 batch W liners that overlap in measurement with 80% of the V batch liners.
- 5) Statisticians at each lab to review the summarized data set generated so far and provide feedback at the next meeting.

Summary of Discussion

Mack T-8 Alternative Fuel Supplier Document Vote

Ballot by email was used to vote on approval of the Mack T-8 alternative fuel supplier criteria document.

Results were:

Affirm = 9

Negative = 0

Waive = 2

No Vote = 2

No comments were sent in.

Document approved for addition to the annex of ASTM procedure D5967.

Volvo T-13 Parts (Cylinder Heads / Blocks)

Patrick Holmes – **Volvo to meet next week to further discuss the issues surrounding block part number supersessions and the change in cylinder heads.**

Mack T-11 / T-12 Parts

SwRI provided an update on their T-12 hardware and OC testing.

Phase 1 oil consumption and hardware combinations below (liner-top ring – second ring – oil ring – piston crown)

- Run 1: WXWWE = 20.6 g/hr.
- Run 2: WXXWE = 21 g/hr.
- Run 3: WXXXE = 15.2 g/hr. (asymmetric oil rings)
- Run 4: WXXXF = 70 g/hr. (all of cylinder 6, oils rings for cylinder 2 and 4 remained the same as that in Run 3, rest of hardware came from SwRI's coordinated reference run).

Next run will utilize piston crowns from run 3 (batch F) to see if OC declines.

If piston crown swap does not drive OC, next step would be to dig deeper into rings.

David – Most of the issues point to either liners or crowns, but still some uncertainty around the rings.

Isaac - Stage 5 test to start next week, build did not start Monday as planned. Should be able to fire up Monday or Tuesday of next week. Each iteration should take about 1 week.

Christian – Anything operationally change between the part swaps?

Isaac – Most of the op data fell on top of each other, blowby crankcase and so forth.

Garrett – What was uncovered from the connecting rod snapping during the coordinated reference?

Isaac – There was an issue with the small end bushing for the connecting rod.

David – Any update from Intertek on T-11 reference?

Pablo – Test stopped at 153 hours due to facility outages and weather. Previous reference was at 45 g/hr at this point in the test. This run is at 25 g/hr. Subset of liners selected were comparative to 80% of the V batch measurements across Vo and Rvk/Rk.

Christian – Was the break in performed?

Pablo – Yes but ran straight through with no oil change.

David – Intertek willing to re-run reference?

Pablo – Yes, another 6 liners will be pulled from the subset.

David – What is the status of the T-12 for each lab?

- Intertek – Stand expired and out of hardware.
- SwRI – 1 more test to run.
- Lubrizol – Stand expired and out of hardware.
- Afton – Out of hardware.

David presented a summarized list of parts used so far, stage OC's, ID numbers, and oil used.

Cylinder ID's still needed for Intertek's recent T-11 runs and references, Intertek's T-12 coordinated references, and SwRI's T-12 coordinated reference.

Statisticians from each lab to review the summarized file from David Brass and provide feedback before the next SP meeting.

David shared analysis on Mack T-12 Y batch top rings. There are approximately 2000 available.

- Presentation included batch S, T, U, and X rings to serve as comparison.
- Barrel rise measured (μm): Y batch slightly high compared to batches T, U, X. S batch higher than all other batches.
- Elemental analysis: Y batch similar to X batch with the exception of Zn. X batch had a side coating without Zn. Y batch does and has levels similar to other batches. Surface aluminum present in U batch. Y batch contains no aluminum. Mo/Ni-rich domains similar to X batch.
- Cross Section Analysis: Bulk structure of all batch rings similar, substrate material used is ductile iron. Coating thickness of Y batch similar to U batch, thinner than S and X batches. Cross sectional elemental composition similar to S and X batches.
- Top Ring Pore Density: Number of pores similar to X batch. Distribution of pores is uniform. Roughness of Y and X batch rings are higher than previous batches.
- Molybdenum domains: Y batch moly domains uniform in size throughout surface.
- Ring side coating elemental analysis: Zinc-phosphate coating similar to T and U batches. X rings use a Manganese-Phosphate coating

Robert Warden – Was the same analysis performed on batch W top rings?

David – Yes, should be in the meeting minutes from 2017. Major issue with the W's was surface structure. They were more flat and produced very little wear.

V rings produced very low liner wear, different coating material used. Coating was similar to T-13 liners. Possible reason for low OC in T-13's.

David – Intertek, SwRI how much time is needed to complete the remaining T-12 runs and complete the T-11 reference re-run?

Isaac – Typically need 1 week per run. About 3 weeks is good.

Pablo – 3 weeks should be enough time.

Next Meeting Date/Time

Meeting adjourned 11:33 AM EST

Next meeting time date March 11th @ 10:30 AM – 12:00 AM EST