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**Attachments:** [image001.png](#)  
[T11 & T12 Piston Crown Measurements.pdf](#)  
[T13 Alternate Fuel Supplier Requirements 05122021.pdf](#)  
[Mack T-11 T-12 Part Kits.pdf](#)

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# MACK-Volvo Surveillance Panel Meeting Notes

## 05/13/2021 @ 10:30 A.M. EST

### Attendees

SwRI: Isaac Leer, Jose Starling, Robert (Bob) Warden, Michael Lochte, Travis Kostan  
Oronite: David Lee, Josephine Martinez  
Afton: Bob Campbell, Christian Porter, Todd Dvorak  
Infineum: David Brass (Chairman), Elisa Santos, Jim Gutzwiller  
Intertek: Garrett White (Secretary), Pablo Ramirez, Juan Vega, Martin Chadwick  
Lubrizol: Jim Matasic, Nick Ariemma  
CP Chem: Jon VanScoyoc  
Haltermann: Prasad Tumati  
Exxon Mobil: Paul Rubas  
TMC: Sean Moyer  
TEI: Derek Grosch  
Volvo: Patrick Holmes

### Agenda

1. Mack T-11/T-12 Part Kit Swaps
2. Mack T-12 Coordinated Reference Testing Update
3. Volvo T-13 Alternative Fuel Supplier Criteria
4. Mack T-12 Piston Crowns

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### *Action Items and Key Points*

- SwRI started their T-12 coordinated reference. Halfway through phase 1 oil consumption is in the low 20 g/hr range. Other labs are projected to begin before the end of the month.
- T-13 alternative fuel supplier criteria was discussed. The latest draft will be emailed out for members to review and return to the next meeting with questions.

- **Lubrizol will provide operational data for torque and pre-turbo front/rear exhaust temperatures to be used as part of the T-13 alternative fuel supplier criteria operational data set.**
- Intertek presented 3D imaging data of 2 batch E, 2 batch F subgroup “- “ and 2 batch F subgroup A crowns. Subgroup A crowns found to be slightly oversized on the anti-thrust side when compared to the batch E crowns.
- **Derek to supply 3D imaging data to FM and obtain answers regarding the oversized shift of the batch F subgroup A crowns to the anti-thrust side and the vice/jaw marks above the wrist pin holes.**
- **David to contact Patrick Holmes regarding T-13 non-kit parts shortage.**

## Summary of Discussion

### **Mack T-11/T-12 Part Kit Swaps**

David presented tables that list what hardware can be used in T-11 and T-12 testing:

- For T-11:
  - New kits from TEI will contain W liners, W top rings, W 2<sup>nd</sup> rings, W oil rings, E piston crowns, Y connecting rod bearings, and P main bearings.
  - Kits currently at the labs can be used except for the piston crowns. Crowns from the F batch (regardless of subgroup) can be exchanged with TEI for E batch crowns.
  - Hardware allowed for use is: W liners, W or X top rings, W or X 2<sup>nd</sup> rings, W or X oil rings, E piston crowns, Y connecting rod bearings, and P main bearings.
- For T-12:
  - Labs will be running coordinated referencing with the following: W liners, X top rings, X 2<sup>nd</sup> rings, X oil rings, batch F subgroup E piston crowns, Y connecting rod bearings, P main bearings.
  - Labs that have batch F, subgroup -, A, B, C, or D should exchange them for subgroup E with TEI.

### **T-12 Coordinated Reference Update**

- SwRI started their reference earlier this week, they are currently halfway through phase 1 and oil consumption is in the low 20 g/hr range.
- Intertek is projected to begin their reference the week of May 17<sup>th</sup>.
- Afton should start the week of May 24<sup>th</sup>.
- Lubrizol should start early the week of May 24<sup>th</sup>.

### **T-13 Alternative Fuel Supplier Criteria**

David presented the latest draft of the Volvo T-13 alternative fuel supplier requirements document.

- Sean – The T8 alternative fuel supplier acceptance procedure was edited by ASTM for stylistic changes including numbering and wording (i.e. changing “will” to “shall”) We will need to ensure the changes made on the T8 are implemented on the T-13 before submission.
- Prove out to be performed on a stand with a history of 3 successful calibration tests within the last 4 years.
- Oil to be used will be the current reference oil, 823.
- Critical oil analysis parameters to be used will be the same as a stand reference. These are percent increase of viscosity @ 40 °C from 300 to 360 and EOT/360-hour peak height oxidation.
- Alarm requirements are that the results between tests cannot exceed Level 2 Ei ( $\pm 1.734$ ).
- The operational data requirements from the baseline test (1<sup>st</sup> test) are currently:
  - Average front exhaust temperature  $\pm 40$  °C
  - Average rear exhaust temperature  $\pm 40$  °C
  - Average torque  $\pm 35$  N-m
- David – Any other labs willing to share op data?

- **Nick Ariemma – Lubrizol can provide data.**

### **Intertek Piston Crown Analysis Batch F Crowns**

Pablo presented slides with 3D imaging data comparing batch E piston crowns to batch F subgroup A and batch F subgroup -.

- Key measurements obtained: Wrist pin hole diameter, land diameters, land taper angles, groove diameters, groove height, and groove angles.
- Wrist pin hole diameters within spec, F subgroup A was on the edge of the tolerance.
- Land diameters were found slightly outside of Federal Mogul (FM) tolerance. This may be due to the difference in point at which measurement was taken. Regardless, the land diameters between piston crowns using the 3D imaging did not show any major differences.
- No tolerance for land taper angles, batch F subgroup A slightly higher by about 0.1°.
- Groove diameters well within tolerance and similar across all subgroups.
- Groove heights:
  - 1<sup>st</sup> groove height tolerance is not specified by FM. Other 2 grooves well within tolerance and similar across subgroups.
- 1<sup>st</sup> groove angle, one measurement in F- batch had an outlier which was outside low of the tolerance.
- Overlay of pistons was performed, E batch used as base and F subgroups compared.
  - Blue highlight of images means the base crown protrudes outside of the piston being compared.
  - Batch F subgroup A crowns do not align very well with batch E crowns using 3D overlay.
  - Batch F subgroup A crowns were found offset where the anti-thrust side is oversized and thrust side is undersized.
- F batch subgroup A crowns presented jaw/vice marks above the wrist pin holes. The marks are not uniform around the piston, some areas have more deep marks and other points do not have marks.
- E batch crown had more consistent marks from the jaw/vice around the piston.
- David – Is there a side that was more off than the other?
- Pablo - Anti thrust side of batch A crowns oversized according to measurements.
- David – Are there plans to do subgroup E crowns?
- Pablo – Yes, they are next in line.
- David – We do not have a full understanding of the other subgroups, any data from the others would be helpful.
- Bob Campbell – Derek, could you take Pablo’s data and see what the manufacturer is doing or what fixture is driving the possible misalignment?
- **Derek – Yes, we can do that.**

David – Any other topics anyone would like to bring up?

Christian – There are lots of T13 parts on back order such as water pumps, connecting rods, etc.

Could Pat find out when these will be available again?

**David – I will contact Pat about the parts on back order.**

Meeting adjourned @ 11:33 EST.

### **Next Meeting Date/Time**

June 2<sup>nd</sup> @ 10:30 to 11:30 AM EST

**Garrett White**

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