

MACK-Volvo Surveillance Panel Meeting Notes

01/27/2021 @ 1:00 PM EST

Attendees

SwRI: Isaac Leer, Robert Warden, Travis Kostan, Michael Lochte, Jose Starling
Oronite: Josephine Martinez, David Lee
Afton: Christian Porter, Brent Calcut, Cory Koglin
Infineum: David Brass (Chair), Elisa Santos, Jim Gutzwiller
Intertek: Garrett White (Secretary), Juan Vega, Pablo Ramirez, Martin Chadwick
Lubrizol: Jim Matasic
CP Chem: Jon VanScoyoc
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-12/T-11 Parts
- 2) Volvo T-13 Parts (Cylinder Heads / Blocks)
- 3) Mack T-11 Alternative Fuel

Action Items and Key Points

- Pablo to update the heat map for both batch V and W liners' surface finish measurements by highlighting where the liners used in recent T-12 and T-11 references are relative to each batch's population of liners.
- David to reach out to Volvo directly regarding concerns about recent cylinder head and engine block changes.
- T-8 alternative fuel supplier criteria document to be sent out by email to the surveillance panel members for approval using email ballots.

Summary of Discussion

Mack T-12/T-11 Parts

- SwRI provided an update on their different batch hardware combination T-12 runs. Below are the combination of batch parts being used (liner – top ring – 2nd ring – oil ring – piston crown):
 - WXWWE
 - WXXWE
 - WXXXE (Symmetric oil rings)
 - WXXXE (Asymmetric oil rings)
 - WXXXF
 - WYXXF
- Through 75 hours, oil consumption on WXWWE combination produced oil consumption average of 20.6 g/hr in T-12 phase 1 conditions.
- Subsequent runs should be approximately 50 hours or until a reliable oil weight trend is generated to calculate an oil consumption rate.
- Martin – Could we obtain the liner ID numbers for the runs?
- David showed where current liners in SwRI runs are in the population of W batch liners.
 - Liners being used in these runs are comparable to batch V and spread the range of measurements for batch W.
- David – Only batch W liners remaining correct?
- Derek – Correct, there are no batch V liners remaining.
- David presented current batch hardware amounts remaining.
- Approximately 3100 batch W liners remain.
- Highest OC coming from WYXXF combination (liner, top, 2nd, oil, crown) based on data generated by labs during T-12 coordinated referencing.
- David presented data regarding batch X oil ring symmetry.
- Rail width at 180° position relative to the ring gap in batch X rings had 2 subsets.
 - First 200 batch X rings are asymmetric, the remaining 100 were symmetric relative to the rail widths measured at 1” after the ring gap and 1” before the ring gap.
- 3-5 asymmetric rings were used in each of the recent T-12 coordinated references on new batch hardware as well as 1 T-11 reference.
- SwRI will incorporate 2 runs using all asymmetric and all symmetric batch X oil rings into their different batch hardware combination testing for oil consumption prove out.
- Pablo presented T-11 liner data to be used for selection of batch W liners in a T-11 reference that closely resemble the general population of batch V liners.
- 3 parameters to be used for selection will be Rk (core roughness) Vo (oil retention volume), and Rvk/Rk (ratio used to determine how much a surface resembles a plateau type finish).
- Approximately 5% of the batch W liners match 80% of batch V liners using Rk and Vo.

- Majority of the W liners used in recent T-12 coordinated references were outside of this 5% group of batch W liners.
- Approximately 12% of the batch W liners match 85% of batch V liners using Rvk/Rk and Vo.
 - Majority of the W liners used in recent T-12 coordinated references were outside of this 12% group of batch W liners.
- David – Is there a second subset of liners that align on all 3 parameters?
- Pablo – There are some that overlap on all 3 parameters, but the amount is very low.
- Martin – If the reference were to pass would we still be able to rebuild the engine with new hardware from the 5% group of liners if after a few candidates the kit needed to be replaced?
- David – The initial motion was to allow for running of the reference with selected liners and to discuss calibration status after review of the data.
- Juan – We should not be limited to a single build for a reference period.
- Sean – More data would be needed; a single run does not provide much proof.
- Juan – Would a coordinated reference be needed?
- Jim – It would be good to see one run to show a possible change, Lubrizol's T-11 expires in February. If the reference on the new hardware does not meet the requirements, I could go back to older engine/kit hardware and then conduct another reference attempt.
- Jim – Can you rebuild T11s with the new hardware even though a stand is calibrated on the current hardware?
- Martin – As the procedure is written now, it should be ok to move on to new hardware.
- Sean – In the past it was assumed if hardware proved out to be adequate in the T-12 then they were OK'd for use in the T-11.
- David – A lab has not successfully completed a T11 reference with the new parts, Intertek is the only that has attempted.
- David presented average oil consumption data from stages 1 and 2 for T-12s and average test oil consumption for the T-11's using new and currently approved hardware.
 - SwRI's first hardware combination run included.
- 3 recent T-12 references using WXXXF (liner - top ring – 2nd ring – oil ring) ranged from 91 – 101 g/hr in stage 2
 - Hardware batch combinations VXWWE and VXWWD oil consumption ranged from 89 – 93 g/hr
- Batch F piston crowns appear to produce higher oil consumption when compared to references with batch E piston crowns.
- SwRI's first run with batch hardware combination WXWWE produced average stage 1 oil consumption of 20.6 g/hr.
- David - T-12 OC in stage 1 target should be around 25 g/hr.
- Martin – Could we differentiate the symmetric and asymmetric rings from the runs shown?
 - Data was later updated by David designating whether the batch X oil rings used were asymmetric or symmetric, all X rings used in the runs discussed used asymmetric rings.
- Steve Jetter – It would also be good to look at where the liners used in these runs land in the heat map.

- **Pablo to provide an updated heat map that highlights the liners used from these runs relative to both liner batch populations.**

- David – Intertek still willing to run the T-11 reference on selected liners?
- Juan – Yes, only concern is the limit of not being able to rebuild the engine mid-calibration period in the event a kit replacement is needed.
- David – We will reevaluate calibration status after the run. When will the run begin?
- Pablo – Should start mid-next week (week of February 1st)

- David presented calculations for oil remaining at end of test (EOT) of T-11 and T-12 references.
 - Calculations were made due to concern from panel members about having an inadequate amount of oil to complete a test safely.
- David – What is a good lower bound of oil remaining at EOT to safely run with lower viscosity grades that might have higher OC?
- Using the highest OC rates from different viscosity grades to date, the EOT oil amounts were calculated and compared.
- Christian – Other concerns are how much timing would have to change in stage 1 for the T-12 to meet the 100-hour soot requirements and being unable to monitor OC due to an empty external bucket.

- Next steps for T-11/ T-12 hardware:
 - Intertek will run a T-11 reference by selecting liners based on the heat map data presented.
 - SwRI will start their 2nd test soon using new, batch X 2nd rings in place of the previous batch W 2nd rings and run 50 hours of T-12 stage 1 conditions to measure oil consumption.
- David – Do labs still have currently approved hardware kits?
 - SwRI – We should run out by end of February.
 - Based on previous meeting minutes, Lubrizol has one kit remaining which has been installed in an engine. Other labs have no hardware remaining.

Volvo T-13 Parts (Cylinder Heads / Blocks)

David – Any response from Volvo regarding the concerns for the cylinder head changes and engine block part number supersession?

Jim – Have not heard back from Volvo on cylinder head changes.

Christian – No update on the engine block numbers.

David to reach out to Volvo directly regarding both concerns.

Mack T-8 Alternative Fuel

- Relative Viscosity at 4.8% Soot (50% DIN Shear Loss) has been removed from oil analytical requirements.
 - Only Viscosity Increase at 3.8% Soot and Relative Viscosity at 4.8% Soot (100% DIN Shear Loss) will be the oil analytical requirements.
 - Ei values for both parameters must be within +/- 1.734 for both tests.
- Soot at 250 and 300 hours should produce levels not less than, and no more than 1% greater than the reference test at these hours.
- Fuel prove out runs will count against calibration intervals. The stand can return to the previously approved fuel after properly flushing the fuel lines.
- Wording added to utilize stand-based system for fuel prove out.
- David – Would anyone like to motion to allow for email ballots to be cast for approval of the document?
- **MOTION: Robert Warden (SwRI) – Motion to allow the use of email balloting for approval of adding the T-8 Alternative Fuel Supplier Criteria document to the annex of ASTM D5967 (T-8 test procedure).**
- **Christian Porter (Afton) – Seconds the motion**
 - **Approved: All**
 - **Opposed: None**
 - **Waived: None**
- ***Motion carried.***

Next Meeting Date/Time

Meeting adjourned 2:21 PM EST

Next meeting time date 2/19/2021 10:30 AM – 12:00 AM EST