

CAT Aeration Test Task Force meeting Nov 14, 2014

Matrix Plan

Attendees: Names Highlighted in **Yellow** attended the meeting

Participant	Name	Email	
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21	Dan Arcy	Dan.arcy@shell.com	Shell

Matrix testing status

SWRI: 4 tests run, fifth is starting. Data will be sent as a spreadsheet.

Intertek: (Tim was not available to answer – but we presumed 4 tests are done)

Lubrizol: three oils done; fourth will start

The operational data of the Matrix will be reviewed by the TF next week.

Si-free gaskets:

Caterpillar has sent to the TF several options for Si-free seals. Of these options, the TF focused specifically on the following:

- Manufacture Si-free seals. Caterpillar will continue this process to develop these seals.
- Reusing seals from C13 engine tests. This was discussed as a good option. Oil pan gasket, valve cover and front cover seals (main contributors to Si) can be used from the C13 test.

It was brought up that since we don't know what oil was run in the engine, then there could be a contamination risk. However, this risk may be low since the break-in process should flush these seals adequately.

SWRI can save all the seals from the C13. The seals will be kept flat and removed carefully to ensure no damage.

Si impact on aeration: Infineum shared information that showed clear impact of Si leached from the seals on the aeration level. Document is attached.

Impact of pump speed on the aeration: Infineum also shared information showing the impact of the pump speed on the aeration. The TF discussed this issue in detail.

The TF agreed that during the Matrix review, we need to look into the controls of the pump.

SWRI stated that they collect this data.

Overall Actions:

- 1- Review the Matrix data next week
- 2- Obtain the pump data and add it to the spread sheet in the same column format. Encode it the same among the three labs? The lab engineers have to agree on the order of reporting.
- 3- What labs have them? Record the output. The numbers will be different among the labs, but within the reported data of each lab, the data can be judged if there are anomalies.
- 4- Include the outputs of all the parameters collected.
- 5- Report which ICP instrument has been used to test Si for the tests.
(Martin will contact the three labs to coordinate the data to be reported)

Lab engineers will discuss re-updating the Prove Out runs to include the same operational data.

Si RR:

Elisa presented the proposed plan for RR testing of Si. Refer to attached documents for details.

ICP method is developed for multiple elements. Hence there are compromises such as calibration curves that target higher level of Si.

The TF discussed Quantification of where we are and assessment whether any further action is needed. Understand lab repeatability was also discussed.

Oil selection for the matrix was discussed: Precision is critical at the level of the test oils. Hence, one of the test oils can be a Matrix oil >10 ppm Si new. The other test oil could be a used oil sample from low Si oil.

Repeatability should be on one ICP instrument in each lab. This instrument is typically dedicated to D5185 and is typically used for this aeration test.

Report which instrument has been used to test Si for the tests.

Action:

- 1- Two oils will be used.
- 2- 7 tests per oil, repeat on a different day, on the same instrument.
- 3- Use the Matrix oil that is >10 ppm. TMC will select a new oil with highest Si level. The second oil need to be requested from the labs at EOT. TMC will send samples "blind".
- 4- 1 4OZ bottle will be sent for each oil to each lab.

Action: Hind will coordinate with the labs to send back a quart of used oils to TMC; and will work with TMC on the oil selection.