

Chain Wear Task Force Conference Call

October 22, 2015

Attendees:

SWRI – Felt Mounce

Intertek - Al Lopez, Jason Soto

Ford – Ron Romano

Afton – Christian Porter, Ed Altman

Lubrizol – George Szappanos, Kevin OMalley

Infineum – Gordon Farnsworth, Ryan Rieth, Doyle Boese

TEI –Dan Lanctot

TMC – Rich Grundza

Oronite –Mahboob Hosseini, Jo Martinez

OHT – Jason Bowden, Matt Bowden

Exxon – Jordon Smith

Ashland – Amol Savant

Test Status:

Afton completed run on reference oil. Highest wear result so far. Currently running test on LWO. Christian recommends all labs run another test on LWO using updated procedure, and updated measurement procedure in order to have a “clean” dataset. Intertek expects to start a run on LWO in a couple of weeks.

Ashland running test on refernece oil.

Amol suggested labs send ramp data to TMC. Rich will work with labs to develop an Excel spreadsheet so all labs can submit data in the same format. Labs to submit data by Friday October 30th.

Data Dictionary:

Rich discussed some of the updates/changes needed for the report form. Will add some temperatures and analysis. This could take some time, but should not delay any matrix testing.

Chain Wear Measurement:

A small group from the testing labs met Wednesday, October 21st to discuss the chain wear measurement procedure. After much discussion concerning why the chain “oscillates” and measurements change, the group settled on an updated measurement procedure. The primary changes have to do with the preparation of the chain before and after measurement. It’s thought a dry chain oscillates and takes a while to settle in position on the gear location. It was also suggested we may add to the number of measurements in the rig programming. George will check into that. Here’s the final update to the measurement procedure:

Timing chain cleaning procedure: (Completed before break in measure and EOT measure)

1. Remove chain from engine and wipe lightly with lint free cloth.
2. Place timing chain into an ultrasonic bath with Stoddard solvent for 20 minutes
3. Remove the chain from the ultrasonic cleaner and dip into room temperature Stoddard solvent to cool chain
4. Dip the chain in heptane or solvent 142 to remove excess Stoddard and prevent rust
5. Dip Chain in EF- 411
6. Wipe off excess EF- 411
7. Place in metrology lab a minimum of 2 hours before starting the measurement procedure. This will allow the temperature of the chain to stabilize.
8. Measure Chain

After the break in measurement is complete:

1. Place timing chain into an ultrasonic bath with Stoddard solvent for 20 minutes
 2. Remove the chain from the ultrasonic cleaner and dip into room temperature Stoddard solvent to cool chain
 3. Dip the chain in heptane or solvent 142 to remove excess Stoddard and prevent rust
 4. Dip Chain in Test oil
 5. Wipe off excess Test oil
 6. Install timing chain on engine and start the test.
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The group went through the “New Test Template” and the “Test Matrix Readiness Criteria” checklists. Both of these are attached.

Next Meeting: Wednesday October 28nd, 2015 in Detroit

ASTM New Test Type Introduction Template
Chain Wear Test

Items rated as “A” status and marked with * require supporting documentation to be attached

1.0 Action Plan

1.1 Reference Oils

- 1.1.1 Do the majority of reference oils represent current technology? __A__
Failing oil is GF-5. Passing oil is prototype GF-6 should meet most GF-5 requirements
- 1.1.2 Are the majority of reference oils of passing or borderline pass/fail performance? __A__
Yes
- 1.1.3 Is reference oil supply and distribution handled through ASTM/TMC? __A__
Yes
- 1.1.4 Is a quality control plan defined and in place? __A__
Same as VG
- 1.1.5 Is a turnover plan defined/in place to ensure uninterrupted supply of reference oil and an orderly transition to reblends? __A__
Same as VG
- 1.1.6 Is a process for introducing replacement reference oils defined and in place? __A__
Same as VG
- 1.1.7 Are oils blended in a homogeneous quantity to last 5 years? __A__
TMC process
- 1.1.8 How many reference oil are there and what are the identifying oil codes?
TMC1011 - Tech 1 (0W-16)
TMC270 - Tech 5 (5W-30) – Failing reference oil
TMC271 - Tech 10 (5W-30) – Low wear reference oil _____

Comments:
Typical TMC process

2.0 Test Parts

- 2.1 Are all critical parts identified? __A__
- 2.1.1 List the parts consider as critical. Shown in procedure
- 2.2 Is a system defined/in place to maintain uniform hardware? __A__*
Parts are batch supplied
- 2.3 Is there a system for engineering support and test parts supply? __A__
Same as VG
- 2.3.1 How many tests can be run with the supply of parts currently in stock?
Current parts will deplete April 2016. New purchase in progress
- 2.4 Are critical parts distributed through a Central Parts Distributor (CPD)? __D__
Critical parts are at the labs. Rest available through suppliers in the procedure.
- 2.5 Are critical parts serialized, and their use documented in test report? __A__
Handled same as VG. Chains contain batch number
- 2.6 Are all parts used on a first in/first out basis? __A__
Yes. Process will be part of procedure and identification on test forms

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action; E - TBD

ASTM New Test Type Introduction Template

Chain Wear Test

- 2.7 Are all rejected critical parts accounted for and returned to the CPD? __D__
- 2.8 Does the CPD make status reports to the test surveillance body at least semi-annually? __A__
- 2.9 Is there a quality control and turnover plan in place for critical test parts, including identification and measurement of key part attributes, a system for parts quality accountability, a turnover plan in place for simultaneous industry-wide use of new parts or supply sources? __A__*
Part batches will be segregated by the labs and batches identified on test forms for critical parts. Measurements are identified in the procedure.
- 2.10 Is the CPD active in industry surveillance panel/group, and in industry sponsored test matrices? __A__
Yes (Task Force at this point)

Comments:

3.0 Test Fuel

- 3.1 Is the fuel specified and the supplier(s) identified? __A__
- 3.1.1 Who is the fuel supplier? Halterman
- 3.2 Is a process in place to monitor fuel stability over time? __A__*
- 3.3 Are approval guidelines in place for fuel certification? __A__*
Must meet EEE spec.
- 3.4 If the test fuel is treated as a critical part of the test procedure:
Is an approval plan and severity monitoring plan for each fuel batch in place? __D__*
Not critical part
- 3.5 Is a quality control plan defined and in place to assure long term quality of the fuel? __A__*
Must meet EEE spec.
- 3.6 Is a turnover plan defined, in place and demonstrated to ensure uninterrupted supply of fuel? __A__*

Comments: EEE fuel is used for the test and will be handled as is for other tests using EEE fuel.

4.0 Test Procedure

- 4.1 Is a technical report published documenting, per ASTM Flow Plan:
- 4.1.1 Test precision for reference oils? __B__*
When Precision matrix is done
- 4.1.2 Field correlation? __A__*
Yes. Test developed using two different chain materials and shows the same performance with these materials as seen in the field.
- 4.1.3 Test development history? __B__*
When research report is complete.
- 4.2 Are test preparation and operation clearly documented in a ASTM standard format? __B__*

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Draft test procedure is posted on the TMC website. ASTM formatting is in progress, facilitator assigned.

4.3 Are test stand configuration requirements documented and standardized? A *

In procedure

4.4 Are milestones for precision improvements established? B *

Will be done by SP when in place

4.5 Are routine engine builder workshops planned/conducted? A

First build workshop occurred in February 2015

4.5.1 How often and by whom? Task Force/Surveillance to determine

Comments:

5.0 Rating and Reporting of Results

5.1 Are the reported ratings from single raters (i.e. not averages from various raters)? D

No subjective ratings. Measurements only

5.2 Is a suitable severity adjustment system in place? B *

Will be part of LTMS. This test needs to be written into LTMS after the PM

5.3 Is each pass/fail parameter unique and have a significant purpose for judging engine oil performance? A

5.3.1 List the pass/fail parameters. Chain elongation

5.4 Do all rate and report parameters judge operational validity, help in test interpretation or judge engine oil performance? A

5.5 Are routine rater workshops conducted/planned? A

Chain measurements round robins will be done as soon as all measurement rigs are up and running. All labs used a standardized measurement apparatus.

5.5.1 How often and by whom? Task Force to determine once all labs have measurement rig.

Comments:

6.0 Calibration, Monitoring and Surveillance

6.1 Is a process in place for independent monitoring of severity and precision with an action plan for maintaining calibration of all laboratories? B *

Will be part of LTMS. Needs to be set up for this test after PM

6.2 Are stand, lab, and industry reference oil control charts of all pass/fail criteria parameters used to judge calibration status? B *

Will be part of LTMS.

6.3 Does the specified calibration test interval allow no more than 15 non-reference oil tests between successful calibration tests? B

Will be part of LTMS.

6.4 Is an ASTM Surveillance Panel in place? B

Task Force in place will transition to a Surveillance Panel

6.4.1 Who is chairman? ED Altman

RATING SCALE: A - Completed; B - In Progress; C - Planned; D - No Action; E - TBD

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Comments:

7.0 Test prove out data

7.1 Has a test development Task Force/TMC visit been made to each of the labs that will participate in the industry precision matrix? __A__

All lab visits completed.

7.2 Have prove out tests been run with the finalized test procedure and test parts? __A__*

Yes and more testing in progress

7.2.1 How many labs and stands? _4 labs presently running the test and 4 plan to participate in the precision matrix__

Test Matrix Readiness Criteria

After accepting the design of the Test Matrixes, the AOAP shall vote on whether each test is ready for Matrix Testing, including the test procedure, materials supply, and the ability to discriminate between oils. AOAP must determine, as per the procedures in Annex C to API 1509, Engine Oil Licensing and Certification System, that the following conditions are met for each test in the Matrix before its Matrix Testing begins. Each condition must be confirmed specifically in a Test Development Task Force conference call, meeting, or written or electronic ballot. The Test Development Task Force chairs will determine which method of approval listed above will be used after consultation with the AOAP. The following conditions must be met before Matrix Testing begins:

☑ Each oil used to demonstrate discrimination has a minimum of two valid test results in the documented Test Matrix procedure. The Test Development Task Force must approve these results.

[We meet this since we have more than 2 tests on the LWO and HWO. We only have one test on Tech 1 but that's not an oil that will be used to demonstrate discrimination.](#)

☑ Each Matrix Lab has run at least two operationally valid tests (shakedown runs are eligible) using the Test Matrix procedure. Shakedown runs are full-length, operationally valid runs on oils such as potential candidate or research oils. The Test Development Task Force will determine if these test results are satisfactory.

[We have this in IAR, SWRI and Afton](#)

☑ The Test Development Task Force has visited each Matrix Lab and filed a report with the ASTM Test Monitoring Center regarding the Matrix Lab's conformance to specifications that include, at a minimum, completed lab inspection checklists.

[All labs have been visited, Visit summaries were sent to the TF](#)

☑ Matrix Lab readiness, as summarized by the lab inspection team reports, is deemed satisfactory by a majority of the members of the Test Development Task Force.

[TF voted this test was ready for matrix](#)

☑ The current batch supply of critical test parts used in the Test Matrix is sufficient to use in post-Matrix Testing beyond one reference cycle.

[Current inventory should run out by April 2016.](#)

☑ A matrix ready report packet has been approved by the Task Force and implemented by all Matrix Labs. At least one successful data transmission to the ASTM TMC is required before matrix oils will be assigned.

[Report forms are complete and on the TMC website.](#)

☑ The Task Force has approved and posted on the ASTM TMC website operational control parameter ‘for matrix use’ Quality Index U & L values so that End of Test (EOT) Quality Index values can be reported in the matrix approved test report packet. If Quality Index is not anticipated to be pursued by the Task Force, operational control \pm limits are to be established for all control parameters. The intent is that control parameters are to be centered on the control target, and the average is to be within the \pm limits if Quality Index is not pursued.

Control parameter limits are in the procedure.

☑ The Matrix Test oils are available at the Matrix Test Labs.

All three oils are at TMC

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TMC270 - Tech 5 (5W-30) – Failing reference oil

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The Task Force should define the validity criteria before the start of the Matrix.

Operational parameters within the published limits?