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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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ASTM D02.B0.03 L-37 Surveillance Panel
Members and Guests:

Attached for your review and comment are the unconfirmed minutes of the:

- **June 20th, 2014 S.P. Meeting, Teleconference**

Please direct any corrections or comments to my attention.

Sincerely,

Chris Prengaman, Chairman
L-37 Surveillance Panel

Report of Meeting
L-37 D6121 Surveillance Panel Meeting
Teleconference
June 20th, 2014 Meeting

Attendees:

Voting Members in **BOLD**

Chalkley, Jay – Afton Chemical

Parke, Scott – ASTM TMC

Guzikowski, Joe - Dana

Trader, Angela – Intertek Automotive Research

Smith, Dale – Intertek Automotive Research

Prengaman, Chris – Lubrizol

Gropp, Jerry – Lubrizol

Hamilton, Larry - Lubrizol

Umerley, Matt – Lubrizol

McGlone, Bruce - Meritor

Warden, Rebecca – Southwest Research Institute

Koehler, Brian – Southwest Research Institute

The meeting was called to order at 1000 EST.

1.0 Agenda Review

The agenda was reviewed

2.0 Meeting Notes

The group continued to discuss lab built axles.

The group agreed that perception and historical data leads everyone to believe TMC 155 is stronger than TMC 152. The weaker of the two should be used in the approval matrix.

The group agreed TMC has the ability to notify the lab after two successive OC's have been received to avoid running the third and useless test. This is due to the nature of the blind matrix discussed.

The axle housings will be marked in a similar fashion as the L-37-1 test. LAB-XXXXX-XX near the housing vent.

The following wording was proposed to the group during the meeting.

Text in blue is new test in the procedure.

(The following motion would not be brought into the procedure).

Prior to conducting the testing described in section 8.2, a lab may wish to conduct shakedown testing of lab-built axles in order to adjust the build process. Up to 52 hours of such testing may be conducted without counting toward the 650 hours of non-reference oil testing allowed on a calibrated stand. This provision may be used once per calibration period for no more than three calibration periods.

(the following motions would be incorporated into the procedure).

8.2 Use of Lab-Built Axles -

8.2.1 To be approved to use lab-built axles, assemble three axles in accordance with section 8.4 using a non-lubricated V1L528/P4T883A pinion and ring set. Run these axles in tests using a TMC-assigned blind mix of the following oils: one TMC 155-1 and two TMC 134's.

8.2.2 If all three of these tests are operationally valid and meet the LTMS acceptance criteria for the standard V1L528 batch hardware, the stand is calibrated for 4 months or 650 hours of non-reference oil testing (whichever occurs first) and the test lab is approved to continue testing using lab-built axles with V1L528/P4T883A pinion and ring sets.

8.2.3 If only the TMC 155-1 does not meet the LTMS acceptance criteria, the lab is to rerun 1 TMC 155-1 fluid. If the repeat meets the LTMS acceptance criteria, the stand is calibrated for 4 months or 650 hours of non-reference oil testing (whichever occurs first) and the test lab is approved to continue testing using lab-built axles with V1L528/P4T883A pinion and ring sets.

8.2.4 If only one of the TMC 134 tests does not meet the LTMS acceptance criteria, the lab is to rerun two consecutive TMC 134's. If both repeats meet the LTMS acceptance criteria, the stand is calibrated for 4 months or 650 hours of non-reference oil testing (whichever occurs first) and the test lab is approved to continue testing using lab-built axles with V1L528/P4T883A pinion and ring sets.

8.2.5 If two of the three tests do not meet the acceptance criteria, or the required repeats described in 8.2.3 or 8.2.4 do not meet acceptance criteria, 8.2.1 must be repeated if the test stand is to be calibrated on lab built axles and the lab approved to conduct testing using lab built axles with V1L528/P4T883A pinion and ring sets.

Examples: (run order of the first three tests is non-critical)

TMC 155 – AC

TMC 134 - AC

TMC 134 – AC

*Lab is approved & referenced

Case 1 (8.2.3)

TMC 155 – OC – Repeat once – AC

TMC 134 - AC

TMC 134 – AC

*Lab is approved & referenced

Case 2 (8.2.4)

TMC 155 – AC

TMC 134 – OC – Repeat twice consecutively – AC, AC

TMC 134 – AC

*Lab is approved & referenced

Case 3,4,5 – FAILURE CASES

TMC 155 – OC

TMC 134 - OC

TMC 134 – AC

* restart matrix

TMC 155 – OC – Repeat once – OC

TMC 134 - AC

TMC 134 – AC

* restart matrix

TMC 155 – AC

TMC 134 – OC – Repeat twice consecutively – OC, AC

TMC 134 – AC

* restart matrix

8.4 Preparation of Axle:

8.4.1 As an alternative to a complete, newly manufactured axle assembly, a lab may assemble a new V1L528/P4T883A gear set into a reused axle housing. Complete this assembly using a new V1L528/P4T883A gear set, components from the Dana rebuild parts list given in appendix X and the Dana Model 60 Maintenance Manual. Include drive and coast side pattern photos of the ring gear in the test report.

8.4.2 When using an axle assembly re-built per 8.4.1 or an assembly from an older approved hardware batch that was not marked with contact pattern information by the manufacturer, apply gear contact pattern grease on the drive and coast side of the ring gear. Turn the input of the axle assembly while applying a resisting force to the ring sufficient to require an axle input torque of approximately 30 lbf-ft (40.7 N•m). Rotate ring and pinion through the gear contact pattern grease on the drive and coast side and verify that the patterns for both sides are acceptable. Record the drive side contact pattern length and flank values in the test report.

8.4.3 If the axle assembly is a newly manufactured assembly received from Dana Corporation¹⁰, the drive side contact pattern length and flank values will be marked on the axle housing. Record these drive side contact pattern values in the test report.

8.4.4 Use only axle assemblies having a length value of L^2 or L^3 and a flank value of F^{-1} , F^0 , or F^{+1} .

8.4.5 *Breakaway and Turning Torque Measurements*—Determine and record the breakaway and turning torques of the completely assembled test unit.

8.4.6 *Backlash Measurements*—Record the backlash marked on the axle by the manufacturer. Use only axle assemblies having a manufacturer-reported backlash measurement from 0.004 to 0.012 in. (0.102 mm to 0.305 mm).

8.4.6.1 If the test axle is not marked with a manufacturer-reported backlash measurement, remove the cover plate and measure the backlash at four equally spaced locations. Record these four measurements and their average in the test report. Use only axle assemblies with an average backlash from 0.004 to 0.009 in. (0.102 mm to 0.229 mm).

8.5 Install the test unit on the stand with pinion and axle shaft centerlines horizontal. Connect dynamometers and drive shaft to the test unit.

Appendix X

Rebuild Parts List for Lab Built Axles using V1L528/P4T883A gear sets

Dana Part Number	Part
30271	Pinion Nut
42449	Pinion Seal
550358	Outer Pinion Cone (HM88542 Timken)
550359	Outer Pinion Cup (HM88510 Timken)
34801	Pre- Load Shim
550360	Inner Pinion Cone (HM803146 Timken)
550361	Inner Pinion Cup (HM803110 Timken)
30291-1	Pinion Position Shim
30291-2	Pinion Position Shim
30291-3	Pinion Position Shim
550363	Diff. Bearing Cup (382S Timken)
550362	Diff. Bearing Cone (387A Timken)
30276-1	Diff. Shims
30276-2	Diff. Shims
30276-3	Diff. Shims
30276-4	Diff. Shims
40638	Ring Gear Screws (120-140 Lbs/Ft.)
34686	Cover Gasket (Replaced by 34687)

3.0 Adjournment

Motion to adjourn .

Respectfully Submitted

Chris Prengaman