HEAVY-DUTY ENGINE OIL CLASSIFICATION PANEL

OF
ASTM D02.B0.02
August 22, 2025
The Westin Century Ballroom A – Kansas City, MO

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ACTION ITEMS

MINUTES

- 1.0 Call to order
 - 1.1 The Heavy-Duty Engine Oil Classification Panel (HDEOCP) was called to order by Chairman Shawn Whitacre at 1:31 PM on Tuesday, June 24, 2025, in the Century Ballroom A of the Westin Hotel, Kansas City, MO.
 - 1.2 The attendance list is included as Attachment 2.
- 2.0 Agenda
 - 2.1 The agenda circulated prior (included as Attachment 1) was not changed.
- 3.0 Minutes
 - 3.1 The December 2024 minutes were approved as written.
- 4.0 Membership
 - 4.1 There were no membership changes.
- 5.0 DD13 Surveillance Panel Report (Attachment 3)
 - 5.1 Labs completed BOI/VGRA matrix in early 2025, questions came up during BOI/VGRA meeting today which will be addressed later by the panel.
 - 5.2 One acceptable calibration ran this period, with 17 valid matrix tests being completed (BOI/VGRA).
 - 5.3 Hardware update
 - 5.3.1 Current issue with receiving connecting rods from dealers but working on getting a shipment to TEI as soon as possible.
 - 5.3.2 Exhaust rockers are still in stock, but sometimes hard to receive from dealer. TEI has kept a higher volume in stock to avoid supply lapses.
 - 5.3.3 Due to the updated liner screening process, the next batch of liners need to be planned and discussed.
 - 5.4 Reference Oil Inventory, no current issues with 864-2 blended in 2023.
 - 5.5 Next Surveillance Panel Meeting to discuss the BOI/VGRA question on background of validity of reference oil tests that scuff in stage 1.

6.0 Cummins Surveillance Panel Report (Attachment 4)

- 6.1 ISB Update
 - 6.1.1 Camshafts supply significantly lower than expected due to much higher rejection rate (88 kits expected from a batch of 800 made).
 - 6.1.2 Panel will need to convene and review rejection criteria due to the high rejection rate.
 - 6.1.3 New reference oil prove out tests have been completed, and targets were reviewed and accepted by the panel.
 - 6.1.3.1 2.5 years estimated RO life based on current run rates
 - 6.1.4 New hardware introduction has been completed
 - 6.1.4.1 ICF's initially established and will be re-evaluated now that 4 additional reference tests have completed.
 - 6.1.5 Action Items:
 - 6.1.5.1 Calterm parameters to be sent to Cummins for new ECM production completed but need to send it to Cummins.
 - 6.1.5.2 Re-evaluate ICFs
 - 6.1.5.3 Hardware rejection criteria review
- 6.2 ISM Update
 - 6.2.1 Injector adjusting screw new hardware is available at TEI.
 - 6.2.2 New hardware introduction completed and accepted for use.
 - 6.2.3 Sludge variability noted and reviewed; an update was made to standard deviation.
 - 6.2.4 Action Items:
 - 6.2.4.1 Low Viscosity Reference oil need a supplier so no activity.
 - 6.2.4.2 New batch of IAS to come in after depletion of Batch E IAS.
- 6.3 ISB Viscosity Update
 - 6.3.1 Critical parts test uses very small volume of ISB wear test hardware
 - 6.3.2 No reference oil issues.
 - 6.3.3 The panel will support CLOG in any equivalency efforts for the ISB Viscosity Test.
 - 6.3.4 Test procedure was balloted and received no negatives and is expected to be published July 1st.
- 7.0 Mack/Volvo Surveillance Panel Report (Attachment 5)
 - 7.1 7 meetings held during this period as the panel was very active.
 - 7.1.1 2 information letters posted, one for the T-13 and one for the T-12.
 - 7.2 Andrew Smith (Infineum) has assumed the role of Surveillance Panel Chair from David Brass.
 - 7.3 Key Updates
 - 7.3.1 T8 Equivalency matrix design for T8 to ISBV108 discussions and funding underway.
 - 7.3.2 T11 No activity
 - 7.3.3 T12 Coolant changed from Pencool to Delo Extended Life Coolant 7.3.3.1 Update to Pb and Pb2 ICFs.
 - 7.3.4 T13 New reference oil testing completed on TMC 824 which ended up mild of target.
 - 7.3.4.1 New hardware introduced.
 - 7.4 Reference oil update no issues across tests.
 - 7.5 T8 Update
 - 7.5.1 CLOG initiative for T8E to ISB Viscosity 108 Equivalency discussion ongoing
 - 7.5.2 Current action items:
 - 7.5.2.1 Funding request for Equivalency
 - 7.5.2.2 Labs to provide timing update for the funding request.
 - 7.5.2.3 Oil supplier to provide time for blending of requested oils for the matrix.

- 7.6 T11 Update
 - 7.6.1 No activity or issues
- 7.7 T12 Update
 - 7.7.1 Motion passed to stop the usage of Pencool in the T-12 as it is no longer available.
 - 7.7.1.1 Replaced with Delo Extended Life Coolant 50/50.
 - 7.7.2 Lots of statistical work on new ICF for Pb and Pb2 parameters/
 - 7.7.2.1 Test experienced both new parts batches and new coolant at the same time, confounding the data set.
 - 7.7.2.2 New ICF established for Delo 50/50 Coolant with Z/Q hardware (bearings).
- 7.8 T13 Update
 - 7.8.1 New Reference Oil Matrix completed.
 - 7.8.1.1 Targets and Std Dev established.
 - 7.8.1.2 Mild of "borderline" target.
 - 7.8.1.3 Use of TMC 824 temporarily suspended for use in calibration due to mild results.
 - 7.8.2 New hardware batches are currently being introduced using level 2 Ei.
 - 7.8.2.1 When more runs are completed, the panel will start to analyze the data.
 - 7.8.2.2 Batch includes rings from alternative manufacturing site due to oil consumption concerns.
 - 7.8.2.3 Batch includes power cylinder components.
- 8.0 Caterpillar Surveillance Panel (Attachment 6)
 - 8.1 Reference oil update:
 - 8.1.1 COAT No performance shifts on 833-2 vs 833-1 noted.
 - 8.1.1.1 832-1 and 832-2 were suspended by SP due to lack of discrimination.
 - 8.1.2 C13 831-4 supply exhausted, with a meeting planned for July to finalize 831-5 introduction plan.
 - 8.1.2.1 Previous discussion was to treat this as a rolling change to allow for use of remaining 831-4 volume from ISB Wear to accommodate Tech Demo period for PC-12.
 - 8.1.3 1K, 1N, 1R, 1P There were no reference oil issues noted.
- 9.0 Ford Valve-Train Wear Test Mike Deegan (Attachment 7)
 - 9.1 The test has moved to MY2023 platform from 2019 and 2020.
 - 9.2 New ECM utilized for MY23 Aftermarket with locked ECMs for labs.
 - 9.3 Time of test reduced from 200 hrs to 175 hrs with 5.25% soot target plus/minus 0.5%.
 - 9.4 Recent test results show consistent runs across labs and the new ECM, further testing to be completed.
 - 9.5 Next steps
 - 9.5.1 Precision Matrix
 - 9.5.1.1 Determine size and requirements, as well as costs and funding.
 - 9.5.1.2 Confirm adequate parts/oil for testing.
 - 9.5.2 ASTM procedure targeting March 2026 for ASTM approval.
- 10.0 CLOG Verbal Update Brent Calcut
 - 10.1 3 tests in the action items T8E, T11, and T12
 - 10.1.1 T8E Mack/Volvo Surveillance Panel requesting funding from ASTM to run an equivalency matrix.
 - 10.1.2 T11 precision matrix and data generated through Tech Demo is available. ACC processing the data and will be shared to propose equivalency when completed targeting end of July.

- 10.1.3 T12 no new activity since last period (lower priority), but still on the action item list.
 - 10.1.3.1 CLOG to review the replacement options.
 - 10.1.3.2 Once PC12 is completed the plan is to come back to the T12 discussions.
 - 10.1.3.3 Hardware is still available, so there is no priority to replace.
- 11.0 PC12 Category Development Timeline (Attachment 8)
 - 11.1 Target to have final ballots due to ASTM by October 13th to have time to adjudicate ballot revisions prior to December ASTM Sub B meeting December 10, 2025, in Houston, TX
 - 11.2 Confident we are in good shape on timeline currently, but aware that there is still a lot of work to do.
- 12.0 New Business
 - 12.1 None
- 13.0 Next meetings
 - 13.1 TBD, September/October in coordination with PC-12 NCDT.
- 14.0 The meeting was adjourned at 2:22 pm.

D02.B0.02.1 HDEOCP

Shawn Whitacre Chairman Heavy-Duty Engine Oil Classification Panel

June 24, 2025 Kansas City, MO USA



AGENDA D02.B0.02.1



Heavy-Duty Engine Oil Classification Panel

Tuesday, June 24, 2025 1:30pm CDT Westin Century Ballroom A Kansas City, MO USA

- 1) Call to Order/Anti-trust statement
- Minutes Approval of Minutes from December 10, 2024 Meeting in Anaheim, CA USA
- 3) Membership
 - a) Review and update current panel membership
- 4) Surveillance Panel/Task Force Reports
 - a) DD13 SP Report (Robert Slocum, Lubrizol)
 - b) Cummins SP Report (Josh Ward, Intertek)
 - c) Volvo/Mack SP Report (Andrew Smith, Infineum)
 - d) CAT SP Report (Andrew Smith for Jacob Goodale, Infineum)
 - e) Ford 6.7L VTW Test Update (Michael Deegan, Ford)
- 5) Category Life Oversight Group (CLOG) Update
 - a) Support for legacy HD Categories (Brent Calcut, Afton Chemical)
- 6) Old Business
 - a) None
- 7) New Business
 - a) PC-12 Limits Discussion Plan for 2H 2025 (Shawn Whitacre, Chevron)
- 8) HDEOCP Adjournment



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- https://www.astm.org/media/pdf/regs_Regulations.pdf
- For a complete list of standards see
 http://www.astm.org/COMMIT/SUBCOMMIT/D02B0.htm



ASTM-HDEOCP Membership

	Oil and Additive Companies		OEMs
1	Shawn Whitacre - Chevron	1	Patrick Holmes - Volvo Powertrain
2	Steve Jetter – ExxonMobil	2	Wei Qin- Cummins Inc.
3	Karin Haumann - Shell	3	Mike Cabaj – Daimler Truck
4	Mike McLaughlin - BP Castrol	4	Lynsie Delp - Caterpillar Inc.
5	Bruce Tonkel – Valvoline Global Op.	5	Heather DeBaun - Navistar
6	Eugene Scanlon - BASF	6	Ashu Gupta - John Deere
7	Mark Petit - Evonik	7	Stephen Kirby - General Motors
8	Cory Koglin – Afton	8	Jason Andersen- Paccar
9	David Lee - Chevron Oronite	9	Mike Deegan - Ford
10	Greer Gibbons- Lubrizol		
11	Michael Madalian-Infineum U.S.A.		
12	Kyle Kress - Phillips 66 Lubricants		
13	Mark Petraoia, TOTAL Lubricants		

AGENDA D02.B0.02.1



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 - e) Ford 6.7L VTW Test Update (Michael Deegan, Ford)
- 5) Category Life Oversight Group (CLOG) Update
 - a) Support for legacy HD Categories (Brent Calcut, Afton Chemical)
- 6) Old Business
 - a) None
- 7) New Business
 - a) PC-12 Limits Discussion Plan for 2H 2025 (Shawn Whitacre, Chevron)
- 8) HDEOCP Adjournment



New Business

None

PC-12 Category Development



First license for CL-4/FB-4 January 1, 2027

Timing	Group(s)	Location	Activity
June 24, 2025	HDEOCP	Kansas City, MO	Build out plan for remainder of year
August 2025	HDEOCP NCDT	TBD	EMA Proposed Draft Limits for ISBV, DD13, and new seal material
September 2025	HDEOCP NCDT	TBD	Draft proposed spec and issue Exit Criteria Ballot
Early October 2025	HDEOCP NCDT	TBD	Review/discuss EC Ballot response Draft revisions to D4485
October 13, 2025	ASTM		Final Ballots due to ASTM HQ
December 9. 2025	HDEOCP	Houston, TX	Review PC-12 Ballot Results and
December 10, 2025	ASTM Sub B	Houston, TX	Adjudicate D4485 Ballot revisions
December 11, 2025	API LG	Houston, TX	LG Ballot



Next Meeting

 September/October in coordination with PC-12 NCDT activities (location TBD)

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Venhoff	Wes	TMC	WNV@astmtmc.org
Yang	He	Sinopec	

DD13 S.P. Annual Report, June 2025 Presentation to Subcommittee D02.B0

Prepared By: Robert Slocum, S.P. Chair June 2025

DD13 S.P. Report Panel Activity

Labs Completed BOI/VGRA matrix first part of 2025

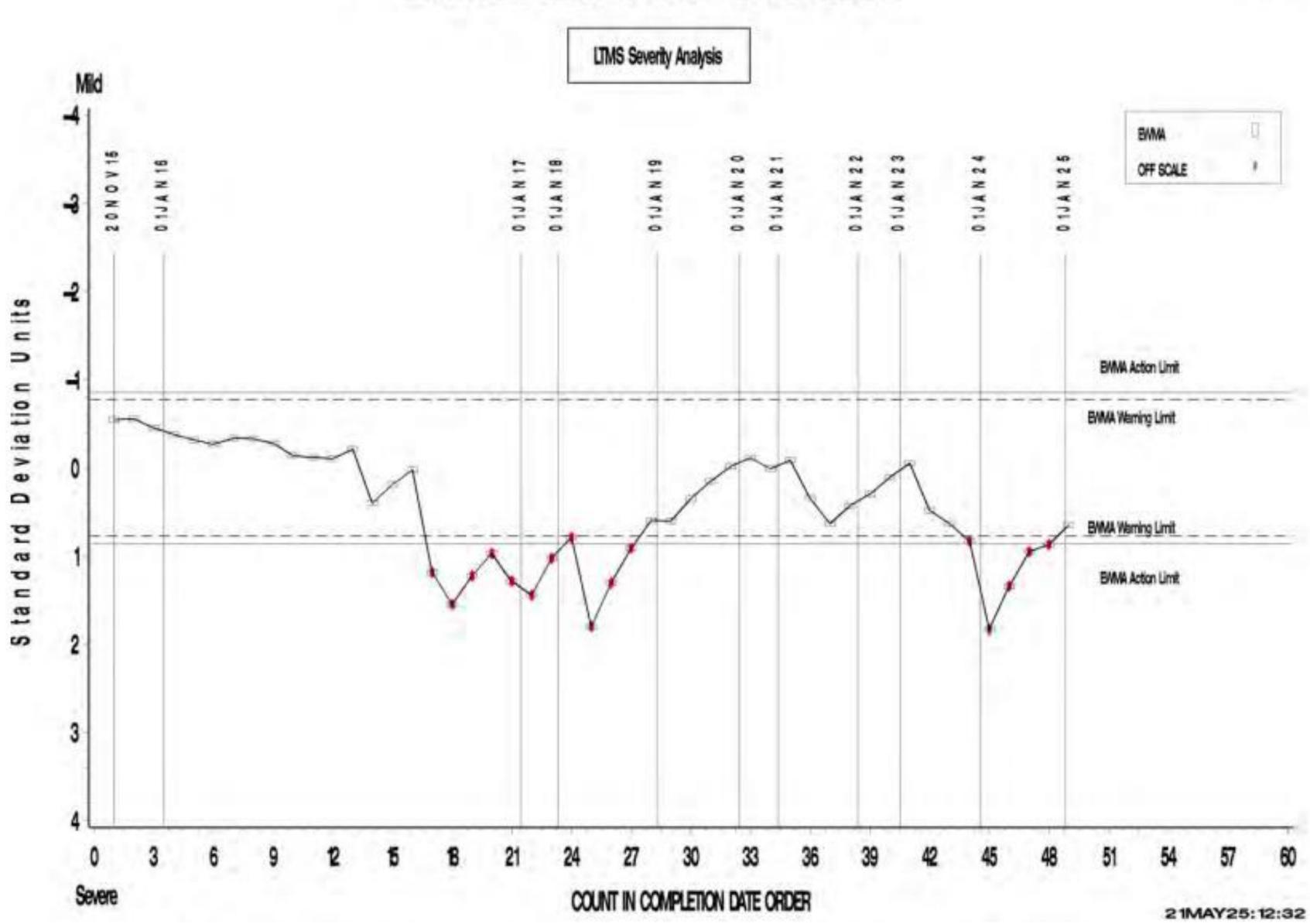
DD13 S.P. Report Reference Test Activity

Acceptable Calibration Test	AC	1
Failed Calibration Test	OC	0
Operationally Invalid	LC	0
Aborted	XC	0
Valid Matrix Test	AM	17
Invalid Matrix Test	LM	1
Total		19

Control Charting DAIMLER DTS INDUSTRY OPERATIONALLY VALID DATA



FNL. ORIG. UNIT HOURS TO SCUFF

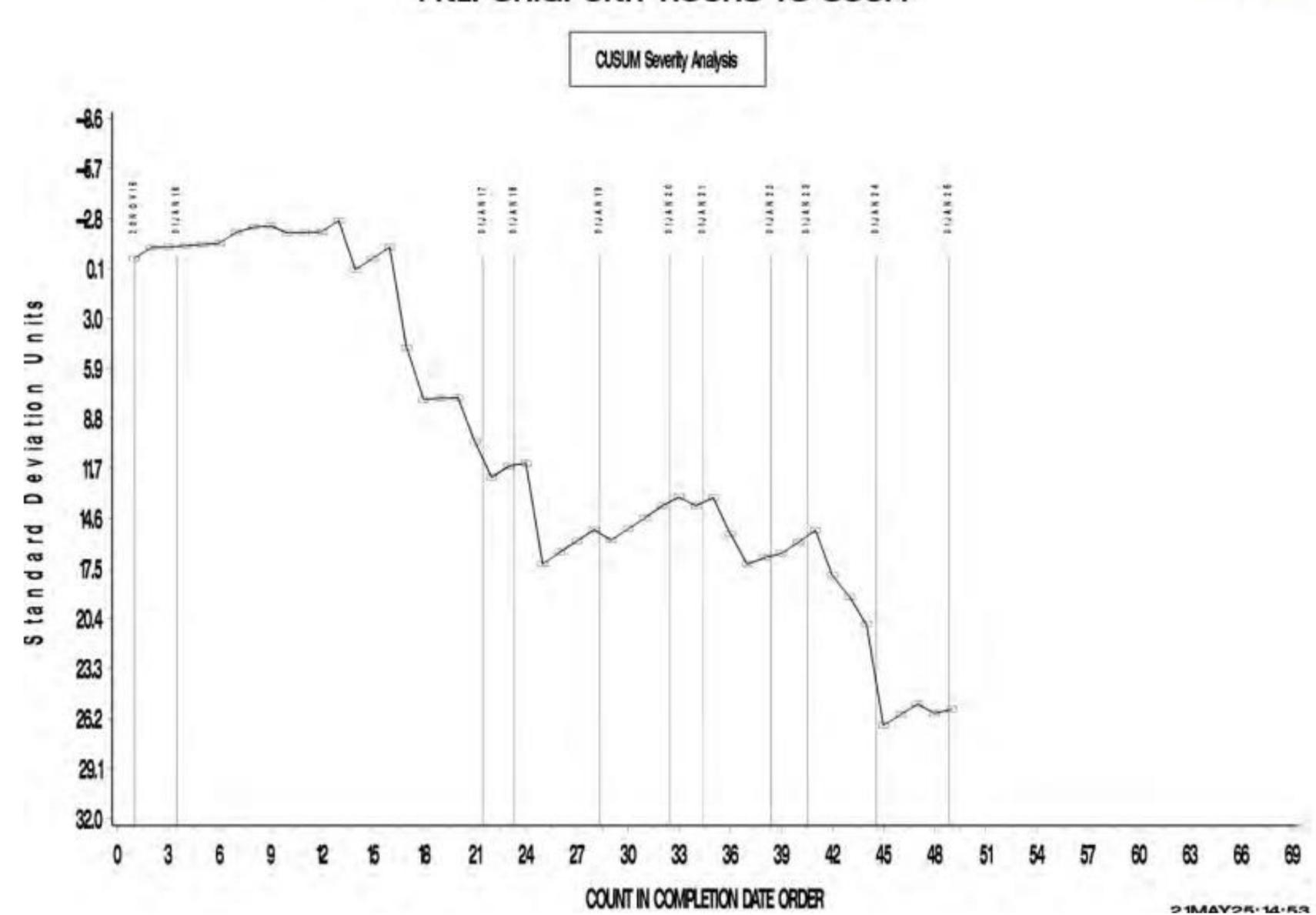


Control Charting

DAIMLER D13 INDUSTRY OPERATIONALLY VALID DATA



FNL. ORIG. UNIT HOURS TO SCUFF



DD 13 S.P. Report Hardware

- Currently having a hard time getting connecting rods but hoping to get a shipment from the dealer soon
- Exhaust rocker arms availability still spotty but TEI is compensating by keeping more in stock
- Due to new liner screening process next batch of liners need to be planned and discussed

Part	Batch	Quantity	Kits Remaining	Years Remaining*
Top Ring	C	1536	256	3.8
Second Ring	В	1273	212	3.1
Oil Ring	В	713	119	1.7
Piston	В	1284	214	3.1
Liner	D	762	127	1.9

*Based on Last 6 months of sales

DD 13 S.P. Report

Reference Oil Inventory Estimated Life

Oil	Year	Test	Blend Quantity	TMC Inventory
864-1	2016	DD13	1576	313
864-2	2023	DD13	1491	1459

DD 13 S.P. Report Next S.P. Meeting

- When: TBD
 - Topics
 - Next batch of liners need to be planned and discussed
 - Other?

Cummins

ISB (ASTM D7484) ISM (ASTM D7468) ISBVIS (ASTM DXXXX)

Surveillance Panel Update

June 2025

Prepared by: Joshua Ward, S.P. Chairman

- 3 labs, 7 test stands are currently calibrated on current hardware batch
 - Critical Parts Inventory
 - Camshaft Batch O: 88 Kits, 439 cams in stock but experiencing 80% rejection rate
 - Tappets Batch G: 510 Kits
 - Crossheads Batch H: 409 Kits
 - Push Rods Batch E: 691 Kits

- Camshaft Issues
 - 70 to 90% rejection rate
 - Around 800 of the 1000 camshafts that were projected to be produced for this batch were manufactured and shipped to TEI
 - Panel will need to review rejection criteria and begin the process of purchasing another batch





- New Reference Oil Update:
 - New reference oil prove-out tests have completed
 - Statisticians' analysis and target proposal for ISB RO 835 was reviewed and accepted
 - RO 835 will be only RO used going forward
 - Current inventory RO835 at TMC 396 gallons
 - Combined inventory between labs and TMC equivalent to 2.5 years of testing
 - ACSW new targets are mean of 3.9338, stand deviation of 0.2302 for the natural log of ACSW
 - ATWL new targets are mean of 9.7057, standard deviation of 1.1755 for the square root of ATWL.

- New Hardware Status:
 - New hardware introduction testing has completed
 - X4 tests completed at 3 labs
 - New tappet batch mild of previous
 - Statistician recommendations were accepted
 - Apply square root transform to tappets and apply natural log transform to camshaft results
 - No ICF for camshaft wear
 - +1.3147 ICF added to transformed tappet wear results
 - Re-evaluate ICF's now that 4 additional reference tests have completed

- Action Items
 - Provide final list of Calterm parameters to Cummins to enable new ISB ECM's to be sold to labs
 - Re-evaluate ICF's with additional reference data
 - Evaluate camshaft rejection criteria and begin process of ordering new batch

- 4 labs, 4 tests stands are currently calibrated
 - Critical Parts Inventory
 - Adjusting Screw Batch E: 33 Kits due to 30% rejection rate
 - Adjusting Screw Batch F: 233 Kits based on expected 30% rejection
 - Crossheads Batch H: 132 Kits
 - Push Rods Batch D: 235 Kits
 - Exhaust Valve Batch G: 173 Kits
 - Intake Valves Batch G: 161 Kits
- Reference Oil Update:
 - Approximately 5 Year Supply of 830-3 at current usage rate

- New hardware introduction on batch HED hardware completed and hardware accepted for use by panel
- Sludge variability in reference testing evaluated by statisticians
 - Targets for 830-3 were updated to a mean of 8.45 and a standard deviation of 0.65

- Action Items
 - Low viscosity reference oil introduction
 - Suppliers can bring oils to the panel to be evaluated for use in the ISM
 - Bring in adjusting screw batch F once Batch E supply is depleted
 - Continue to monitor ISM control charts as reference data on the new hardware becomes available

- 4 labs, 7 test stands are currently calibrated
- Critical Parts Inventory
 - Uses low volume of ISB wear test hardware
- Reference Oil
 - ISBV108 RO834-1 1499 gallons approximately 6 years supply
 - ISBV156 RO822-2 554 gallons approximately 2.5 years supply

- \bullet Procedure review and updates have been completed and is anticipated for publication on July 1^{st}
- Complete ACC Readiness list once limits are set and MTEP established
- Complete any CLOG directed compatibility efforts as able

- 6 Surveillance Panel Meetings this period
- 1st Meeting
 - Review new ISB reference oil results and new hardware introduction plan
 - Status update on ISM new hardware introduction testing
- 2nd Meeting
 - Review statisticians' analysis and target proposal for ISB RO 835.
 - Panel agreed to proceed with ISB new hardware introduction testing

Motion: The panel direct TEI to release the remaining batch N/F/G test kits, TEI can handle the ratio of distribution. Motion carries

- 3rd Meeting
 - Review statisticians' analysis and target proposal for ISB RO 835
 - Review operational data from RO835 testing
 - Status updates on ISM and ISB new hardware testing

Motion: The panel accepts the proposed transforms and reference targets for RO 831-3 and 831-4 for all tests run after July 1st 2021. Camshaft wear will adopt a natural log transformation. Tappet wear will adopt a square root transform. The new targets are mean of 3.7495, stand deviation of 0.2302 for the natural log of ACSW and mean of 9.8590, standard deviation of 1.1755 for the square root of ATWL. Motion carries

Motion: The panel accepts the proposed correction factors for all reference tests run on batch F tappets and subsequent hardware and for all candidate tests on batch F tappets and subsequent hardware that complete on or after February 19, 2025. Camshaft wear will adopt a correction factor of -0.4552 applied to the transformed value. Tappet wear will adopt a correction factor of -0.7410 applied to the transformed value. Motion carries

Motion: The panel accepts the proposed reference targets for RO 835. The new targets are mean of 3.9338, stand deviation of 0.2302 for the natural log of ACSW and mean of 9.7057, standard deviation of 1.1755 for the square root of ATWL. Motion carries

- 4th Meeting
 - Review ISM new hardware test results
 - Status update for ISB new hardware testing

Motion: The panel approves the use of ISM hardware batch HED. Motion carries

- 5th Meeting
 - Review variability in ISM reference sludge results
 - Review ISB new hardware results. Stats group asked to evaluate results

Motion: Update ISB crosshead serial number data dictionary field to 12 digits. Motion carries

6th Meeting

- Review proposed LTMS updates for ISB new hardware
- Discuss ISM sludge analysis and old hardware allocation
- ISBVIS transfer to Cummins SP

Motion: The panel accepts the recommended correction factor of +1.3147 added to SqrtATWL on batch G tappets and to eliminate the ICF on batch O camshafts for all tests run on this hardware completed 2/25/2025 and later. Motion Carries.

Motion: New hardware, batch G tappets and batch O camshafts, must be brought in through a reference test. Stands must run candidate tests on the hardware batch they were referenced on. The panel directs TMC to work with labs to ensure no net gain or loss of reference intervals. Motion Carries.

Motion: The panel accepts the recommendation to update the sludge targets for reference oil 830-3. The new mean is 8.45 and standard deviation is 0.65. Motion Carries.

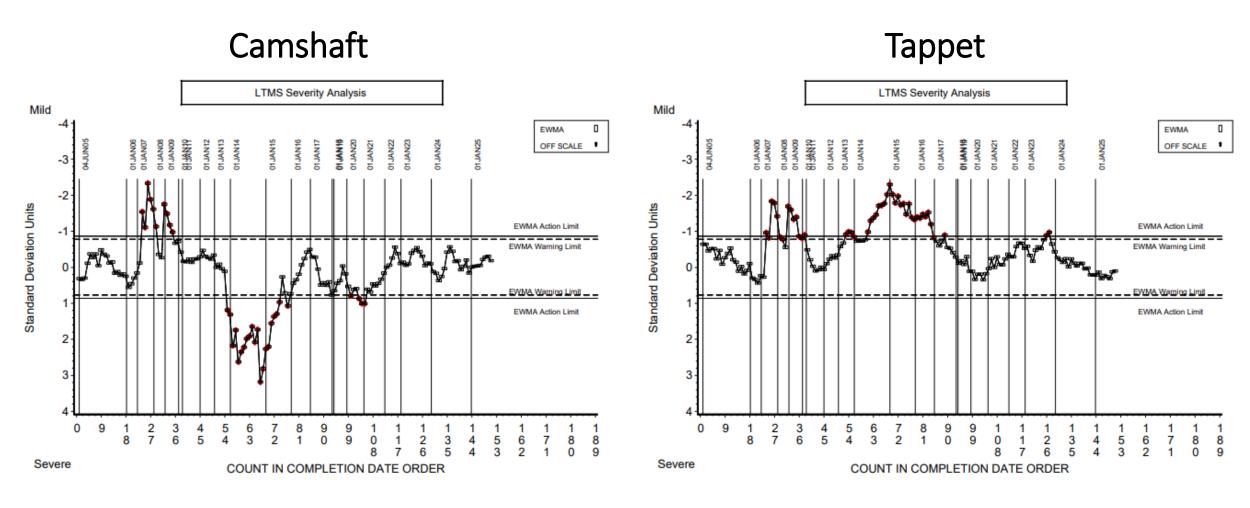
Motion: The panel moves to waive the 2-week waiting period for the prior motions concerning the ISB and ISM LTMS in this meeting due to the critical need for hardware in the industry. Motion Carries.

Motion: The panel is no longer asking TEI to set aside ISM hardware for new reference oil testing. Motion Carries.

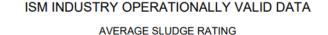
Motion: The scope of the Cummins Surveillance Panel is to be expanded to include the ISBVIS 156 and ISBVIS 108 tests, barring any negative responses on the ASTM balloting. Motion Carries.

• Questions?

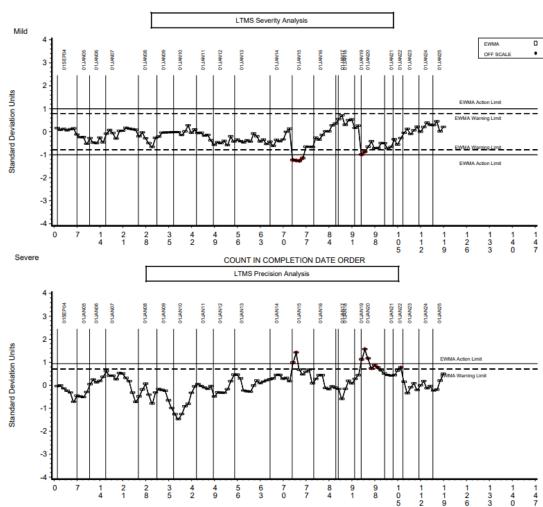
ISB Test Status



ISM Test Status





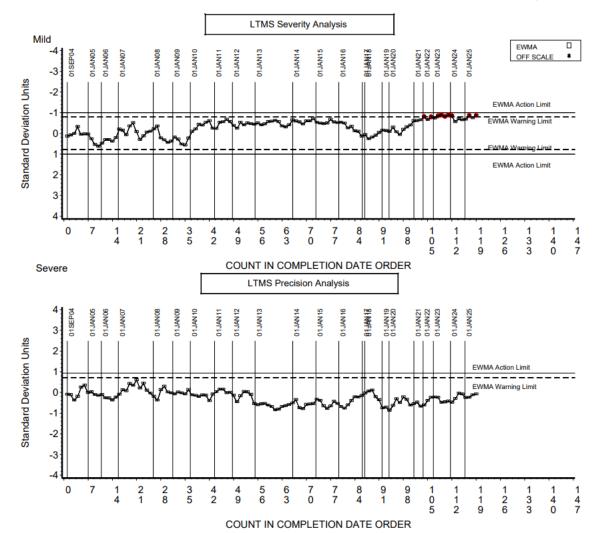


COUNT IN COMPLETION DATE ORDER

ISM INDUSTRY OPERATIONALLY VALID DATA



CROSSHEAD WEIGHT LOSS ADJUSTED TO 3.9 % SOOT



ISM Test Status

ISM INDUSTRY OPERATIONALLY VALID DATA

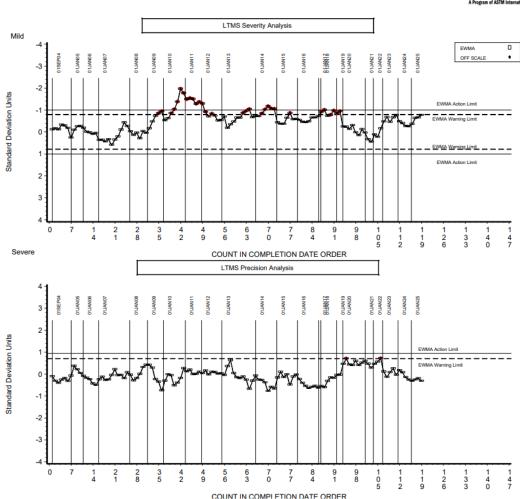
OIL FILTER DELTA PRESSURE

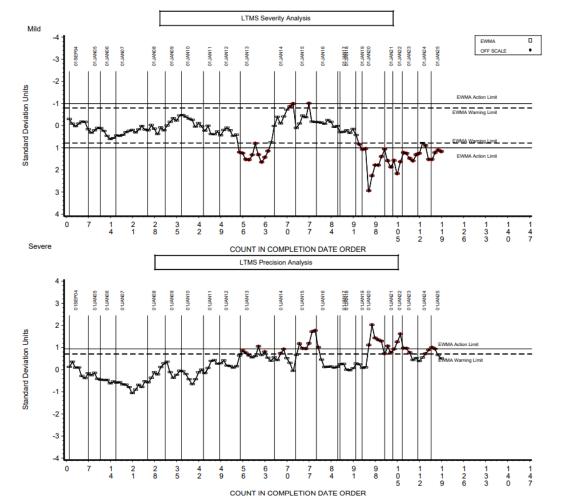


ISM INDUSTRY OPERATIONALLY VALID DATA

INJECTOR SCREW WEIGHT LOSS ADJUSTED TO 3.9% SOOT





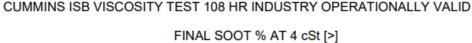


ISBV Test Status

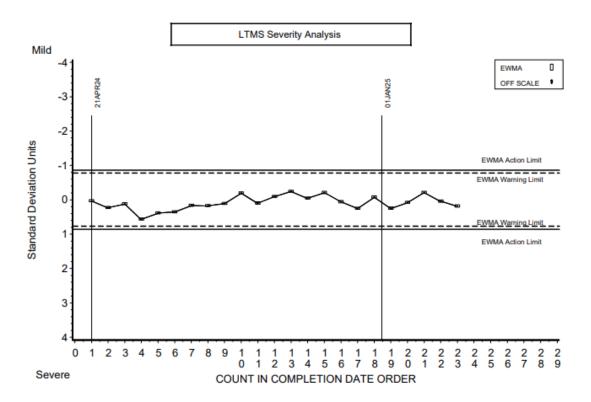
CUMMINS ISB VISCOSITY TEST 108 HR INDUSTRY OPERATIONALLY VALID

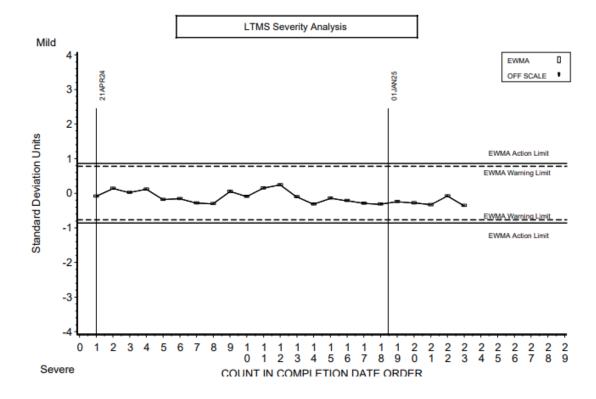
FINAL MRV VISCOSITY [NM, SOLID, FROZEN, <, >]











ISBV Test Status

CUMMINS ISB VISCOSITY TEST 108 HR INDUSTRY OPERATIONALLY VALID

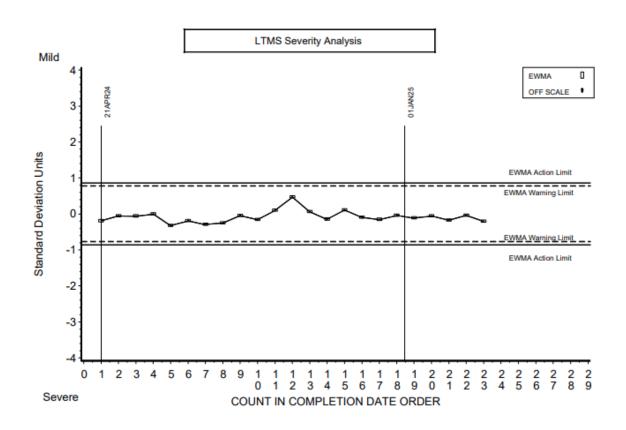
FINAL SOOT % AT 12 cSt [>]

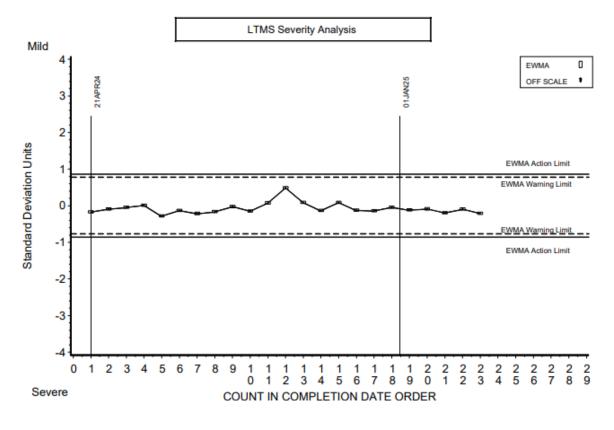


CUMMINS ISB VISCOSITY TEST 108 HR INDUSTRY OPERATIONALLY VALID

FINAL SOOT % AT 15 cSt [>]







ISBV Test Status

CUMMINS ISB VISCOSITY TEST 156 HR INDUSTRY OPERATIONALLY VALID

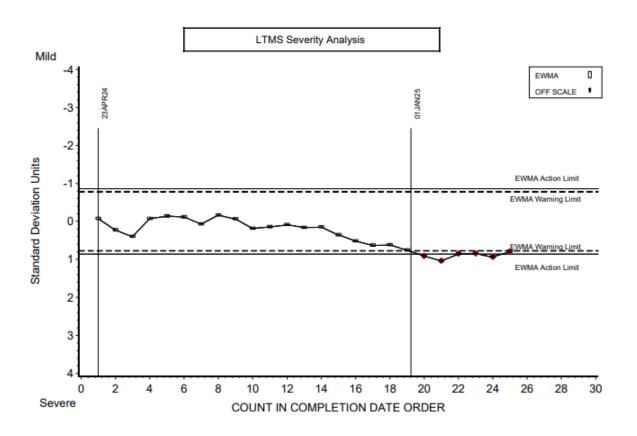
FINAL MRV VISCOSITY [NM, SOLID, FROZEN, <, >]

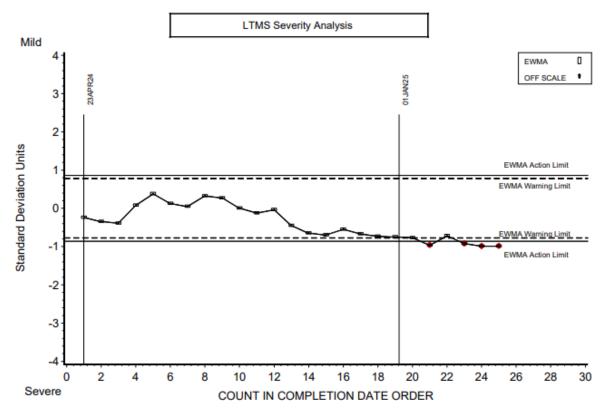


CUMMINS ISB VISCOSITY TEST 156 HR INDUSTRY OPERATIONALLY VALID

FINAL SOOT % AT 4 cSt [>]







ISBV Test Status

CUMMINS ISB VISCOSITY TEST 156 HR INDUSTRY OPERATIONALLY VALID

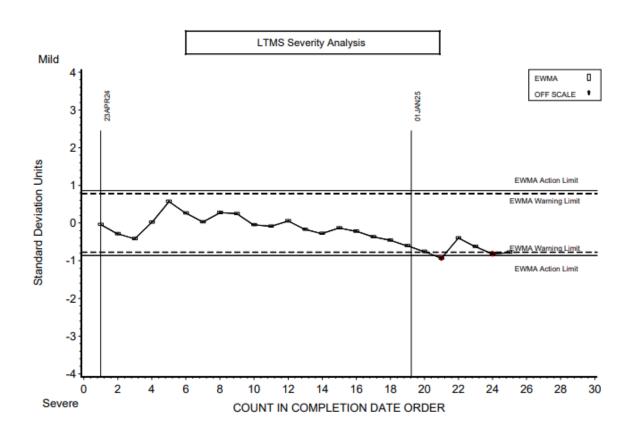
FINAL SOOT % AT 12 cSt [>]

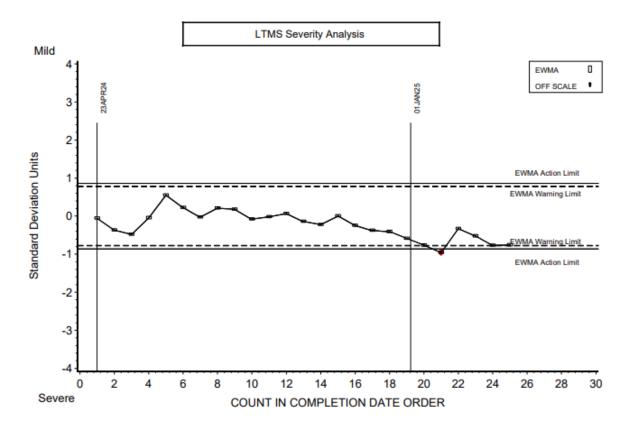


CUMMINS ISB VISCOSITY TEST 156 HR INDUSTRY OPERATIONALLY VALID

FINAL SOOT % AT 15 cSt [>]







Mack / Volvo Surveillance Panel Update

June 24, 2025

Andrew Smith - SP Chair

Meetings

- Surveillance Panel held 7 meetings in the last period:
 - 12/19/24
 - 1/30/25
 - 2/4/25
 - 2/19/25
 - 3/28/25
 - 4/23/25
 - 5/28/25

Surveillance Panel Information Letters:

- IL25-1-T13
 - Updated sections 10.1 and 10.2 of test method making connecting rod bearing, main bearing, ring weight, ring gap increase and liner wear step non-mandatory.
 - Updated sections 8.6.2.2 and 8.6.3.1 to make all noncontrolled and not reported operational parameters not mandatory to measure.
- IL25-1-T12
 - Updated sections 7.3.1 and A2.7 Discontinued use of Pencool 3000 coolant additive, replaced by Delo Extended Life 50/50.
 - Updated sections 11.6.4.4 and 11.6.5.1 Updated ICF's for delta lead parameters.

Key Updates

- Andrew Smith assumes the role of SP Chair from David Brass
- T8:
 - Equivalency matrix design for T8 to ISBV108 discussions and funding
- T11: No activity
- T12:
 - Switch from Pencool to Delo Extended Life Coolant
 - Update to PB and PB2 ICFs
- T13:
 - New Reference Oil testing TMC 824 mild of target, SP voted to temporarily suspend use of TMC 824
 - New Hardware batch EAAAAA delivered and available to labs

Reference Oil Inventory

Test	Reference Oil	TMC Inventory from Semi-Annual Report (Gallons)	Supply
Mack T-8	TMC 1005-5	254	2 Years
Mack T-11	TMC 822-2	554	2 Years
Mack T-12	TMC 821-4	1824	5+ Years
Volvo T-13	TMC 823-1	890	5+ Years
	TMC 824	625	5+ Years

- CLOG initiative for T8E ISB
 Viscosity 108 Equivalency Matrix
- Current action items
 - Funding request to be put in place for ASTM Funding of equivalency matrix
 - 4 T8E tests and 3 ISBV108 tests
 - Labs to provide timing for ability to run the requested tests
 - Oil supplier to provide time for blending of requested oils for matrix

- Test Severity
 - Viscosity Increase at 3.8% Soot still in Action Alarm to be reviewed
 - RV48 and RV2 are in control

Test Status	Validity Code	#	Cause
Acceptable Calibration Test	AC	1	
Failed Calibration Test	OC	0	
Aborted	XC	0	
Total		1	

Labs	Referenced Stands
2	2

 Currently running last batch of hardware, no issues at this time

- Test Severity
 - MRV Warning Alarm to be monitored with additional data
 - Soot4 Action Alarm (has been in action alarm since 2016)
 - Deemed non-critical, little variation
 - Soot and Soot5 under control
- Currently running last batch of hardware, no issues at this time

Test Status	Validity Code	#	Cause
Acceptable Calibration Test	AC	0	
Failed Calibration Test	ос	0	
Aborted	XC	0	
Total		0	

Labs	Referenced Stands
2	2

- Motion passed to stop the usage of Pencool in the T-12 as it is no longer available
 - Replaced with Delo Extended Life 50/50
- Lots of statistical work on new ICF for Pb and Pb2 parameters
 - Test experienced both new parts batches and new coolant at the same time, confounding the data set
 - New ICF established for Delo 50/50 Coolant with Z/Q hardware (bearings)

- Test Severity
 - CLW, OC, PB, TRWL all under control
 - PB2 warning alarm to be monitored with additional data after CF change

Test Status	Validity Code	#	Cause
Acceptable Calibration Test	AC	0	
Failed Calibration Test	ос	0	
Aborted	XC	0	
Total		0	

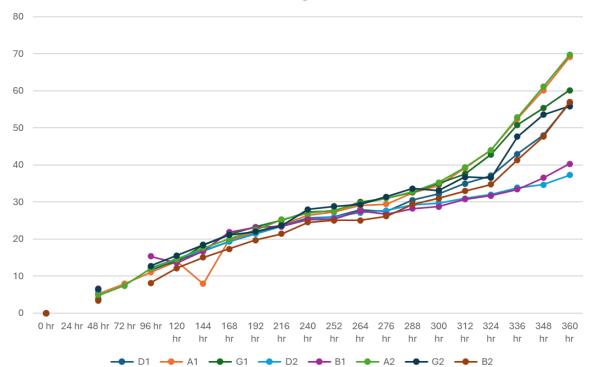
Labs	Referenced Stands
3	3

 Currently running last batch of hardware, no issues at this time

FTIR Peak Height Oxidation

T13

- New Reference Oil Matrix completed
 - Targets and Std Dev established
 - Mild of "borderline" target
 - Use of TMC 824 temporarily suspended for use in calibration due to mild results
- New hardware batches currently being introduced using level 2 Ei
 - When more runs are completed, the panel will start to analyze the data
 - Batch includes rings from alternative manufacturing site due to OC concerns
 - Batch includes power cylinder components



Lob Dun	FTIR Peak	KV40
Lab Run	Height	Transformed
D1	56.6	3.7725
A1	69.1	4.6649
G1	60.1	4.5584
D2	37.2	2.5891
B1	40.3	2.3061
A2	69.7	4.9436
G2	55.8	4.3211
B2	56.9	3.7896
Mean	55.7	3.9
Std Dev	11.0	0.9

- Test Severity
 - IRPH Action Alarm
 - Seemingly caused by new reference oil matrix, will monitor with continued TMC 823-1 data
 - KV40 under control

Test Status	Validity Code	#
Acceptable Calibration Test	AC	8
Failed Calibration Test	OC	0
Invalid	LC	2
Matrix	AM	4
Aborted	XC	0
Total		14

Labs	Referenced Stands
4	7

Mack/Volvo SP Update

• Questions?

Caterpillar Surveillance Panel Update

Jacob Goodale, Caterpillar Surveillance Panel Chair

HDEOCP

June 24, 2025

Key Updates

COAT

• New reference oil 833-2 shows no performance shifts vs 833-1

C13 Deposit Test

- REO 831-4 supply exhausted
 - Meeting planned for early July to finalize 831-5 introduction plan
 - Discussion in previous call was to treat as rolling change.
 - Intent was to use the remaining 831-4 volume from ISB Wear to accommodate PC-12 Tech
 Demo

Reference Oils

Test	Reference Oil	Supply
1K, 1N	TMC 809-1 TMC 811-2	1,846 Gallons 700 Gallons
1R	TMC 822-2 TMC 1005-5	554 Gallons 254 Gallons
1P	TMC 1005-5	254 Gallons
COAT	TMC 832-1 TMC 832-2 TMC 833-1 TMC 833-2 TMC 1005-6	1,214 Gallons 514 Gallons 110 Gallons 801 Gallons 238 Gallons
C13	TMC 831-4 TMC 831-5	0 Gallons 1,846 Gallons

Updates:

TMC 832-1 and 832-2 suspended by SP due to lack of discrimination

MY23 Status

Setup & Run Time

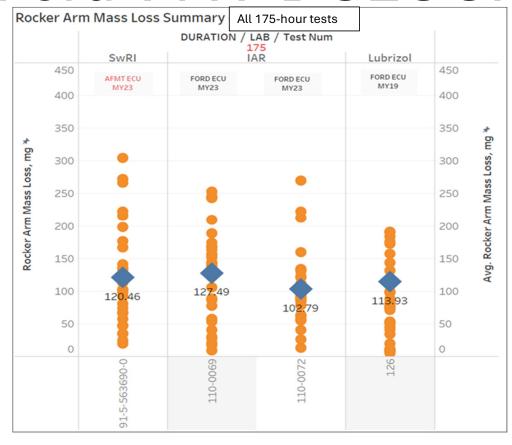
Next Steps

- Precision Matrix
- ASTM



MY23 Status

- Setup:
 - o PC10 or D975 fuel.
 - o Road Tube.
 - o Dual In-Parallel oil filter system
 - ✓ Latest Filter for candidate test
 - ✓ Older Filter for flush.
 - o New ECM.
 - Test Time reduced to 175hrs with 5.25% max soot.



M. Deegan

6/24/2025

Next Steps

- Precision Matrix
 - Determine size and requirements.
 - o Costs.
 - Verify discrimination and precision.
 - Adequate parts/oil for testing.
- ASTM
 - Update to MY23 engine.
 - ✓ Update Soot Requirement based on test time.
 - o Follow up for approval.