

ASTM Engine Oil Gelation Test (EOGT) WK86363 Update

EOFT and EOWTT Surveillance Panel Meeting

May 13, 2025

Yong-Li McFarland, Chair



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EOFT and EOWTT Surveillance Panel Membership

21 members

Sarah Fitzgerald, Afton Chemical

Michael Kunselman, KJA Group

Robert Stockwell, Chevron Oronite

Quanchang Li, ExxonMobil

Michael Deegan, Ford

Melissa Chu, Infineum

Angela Willis, Infineum

Joe Franklin, Intertek

Karina Gil, Intertek

Yuliza Rocha, Intertek

Michael Johnscher, ISP

Litchi Xie, Lubrizol Additive (Zhuhai) Co., Ltd.

Victoria Fein, Lubrizol

Jason Bowden, OH Technologies Inc

Greg Miiller, Savant Group

Sean Alston, SGS North America

Jared Cavaliere, SwRI

Becky Grinfield, SwRI

Yong-Li McFarland*, SwRI

John Loop, TMC

Amy Ross, Valvoline

*Chair



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New EOGT WK86363, ILS# 1854

- Ford request for a new Engine Oil Gelation Test (EOGT): request to add a new test filterability test to better screen oils for field issues
- Status:
 - Method: 1 draft (Afton method V9.6) uploaded on ASTM Collaboration Area
 - Oils: 11 potential reference oils offered; 17 oils received at TMC
 - Screening Tests and ILS: ILS tests ongoing
 - Timing: ILS tests to be run by April, and test available in August 2025

Agenda:

- 1. ILS status, feedback on EOGT method V9.7, determine timing for ILS inclusion
- 2. Concerns from industry on if EOGT is representative of field issue



Pilot II/ILS Updates 5-13-25

- Afton: submitted ILS, but will need to rerun tests in about 2.5 weeks time after arrival
- SwRI: completed ILS
- Savant: plan to rerun Pilot II now
- Intertek: completed ILS
- Valvoline: completed ILS
- Infineum: additional ILS samples will be sent, estimate about 3 weeks to rerun
- Lubrizol: completed ILS
- Richful: waiting on additional Pilot II sample arrival by May 23

- Infineum has additional feedback on method

- Do we rerun tests when results are not as expected?



ILS Details

Labs(8)

- **Afton**
- **Infineum**
- **Intertek**
- **Lubrizol**
- **Richful**
- **Savant**
- **SwRI**
- **Valvoline**

Samples (7)

- **Oil U*** (low flow): 2 containers
- **Oil F** (low flow): 2 containers
- **Oil E** (mid flow): **not** eligible to be reference oil, 3 containers
- **Oil R** (mid flow): 3 containers
- **Oil K** (high flow): 2 containers
- **Oil M** (high flow): 2 containers
- **Oil P** (high flow): 2 containers

Details

- Each Test is 2 runs, results will be reported as average of 2 runs. A duplicate test is 4 runs. A triplicate test is 6 runs.
- Each lab will run 32 runs for ILS
- Duplicate test will need two 120 mL containers and triplicate test needs three 120 mL containers
- Use procedure EOGT 9.7
- Use industry matrix for run order
- Labs to send completed EOGT ILS Report Form to TMC by **July 3.**
- ASTM to start Research Report

3-6-25 Notes: ILS will start and samples to be shipped out by TMC. Report form and latest procedure will be sent out to all labs in ILS.



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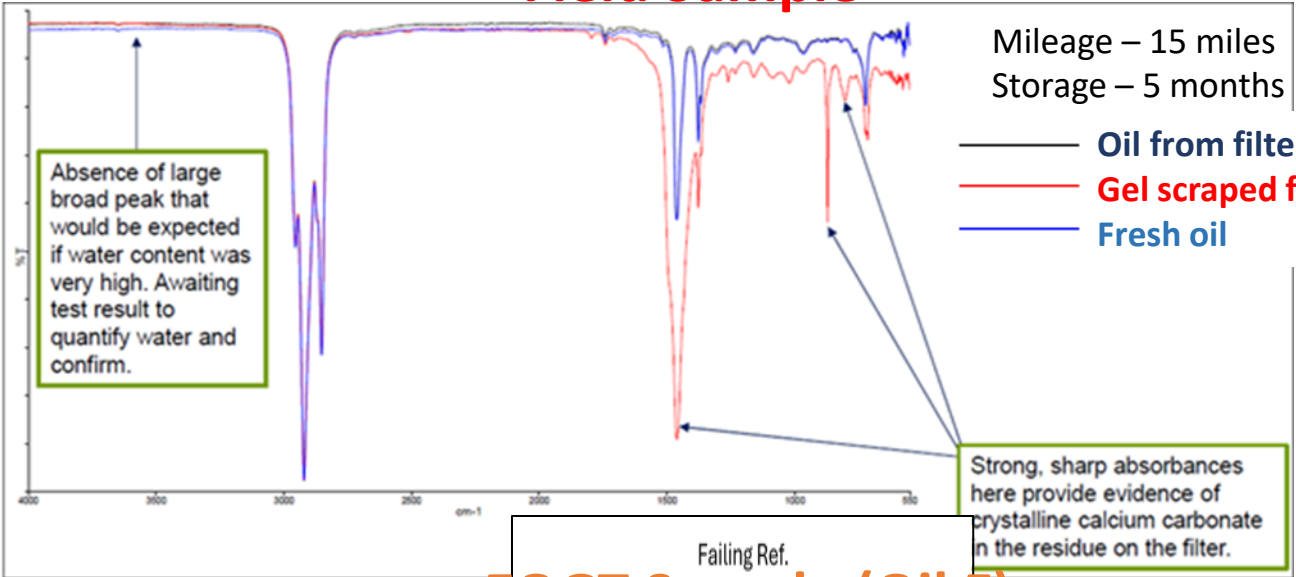
EOGT representative of field issue?

- During Feb 2025 API meetings, multiple questions regarding if the test is representative of the field issue, if gel samples were tested and similar to field samples
 - Concern if EOGT test is correlated to original issue
 - Gel analysis?
 - What is group's response, next steps?
 - Ford (Rob, Mike) to provide a response that can be shared with others.
-
- 3-27-25 Notes: Ford reviewed previous FTIR analysis completed and saw peaks associated with crystalline calcium carbonate which promotes the gelling. EOGT is representative of the field issue. Ford to show FTIR comparison of the field sample and current gelling EOGT sample and current "good" EOGT sample
 - Response for AOAP or Lubricants group.
 - Ford engine test that ran Oil F and K, but no analytical data collected on samples
 - Will FTIR show the calcite?

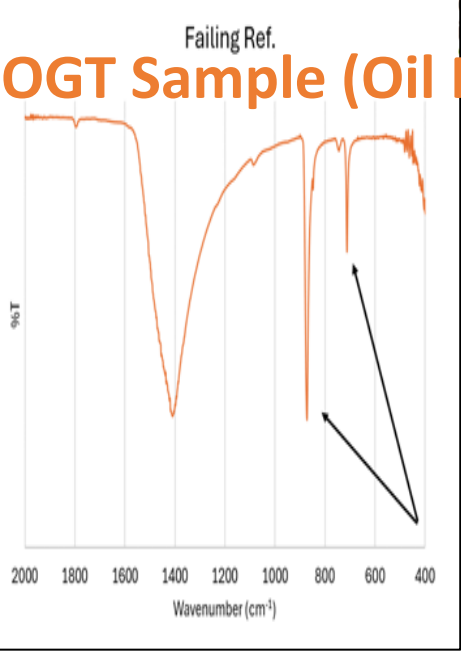


FTIR Analysis

Field Sample

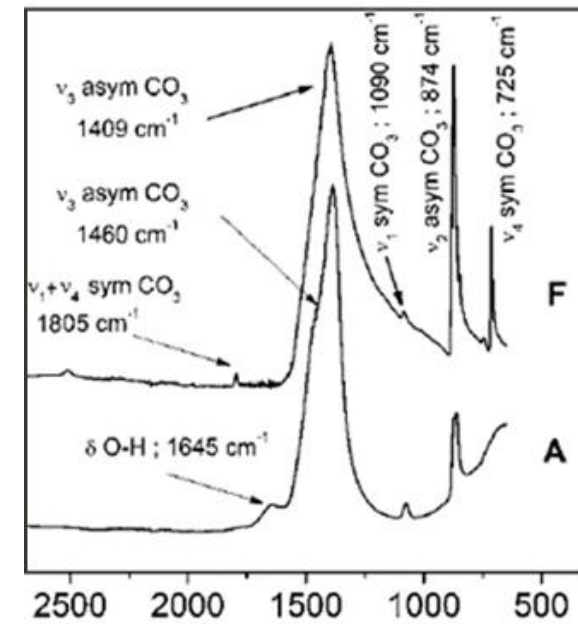
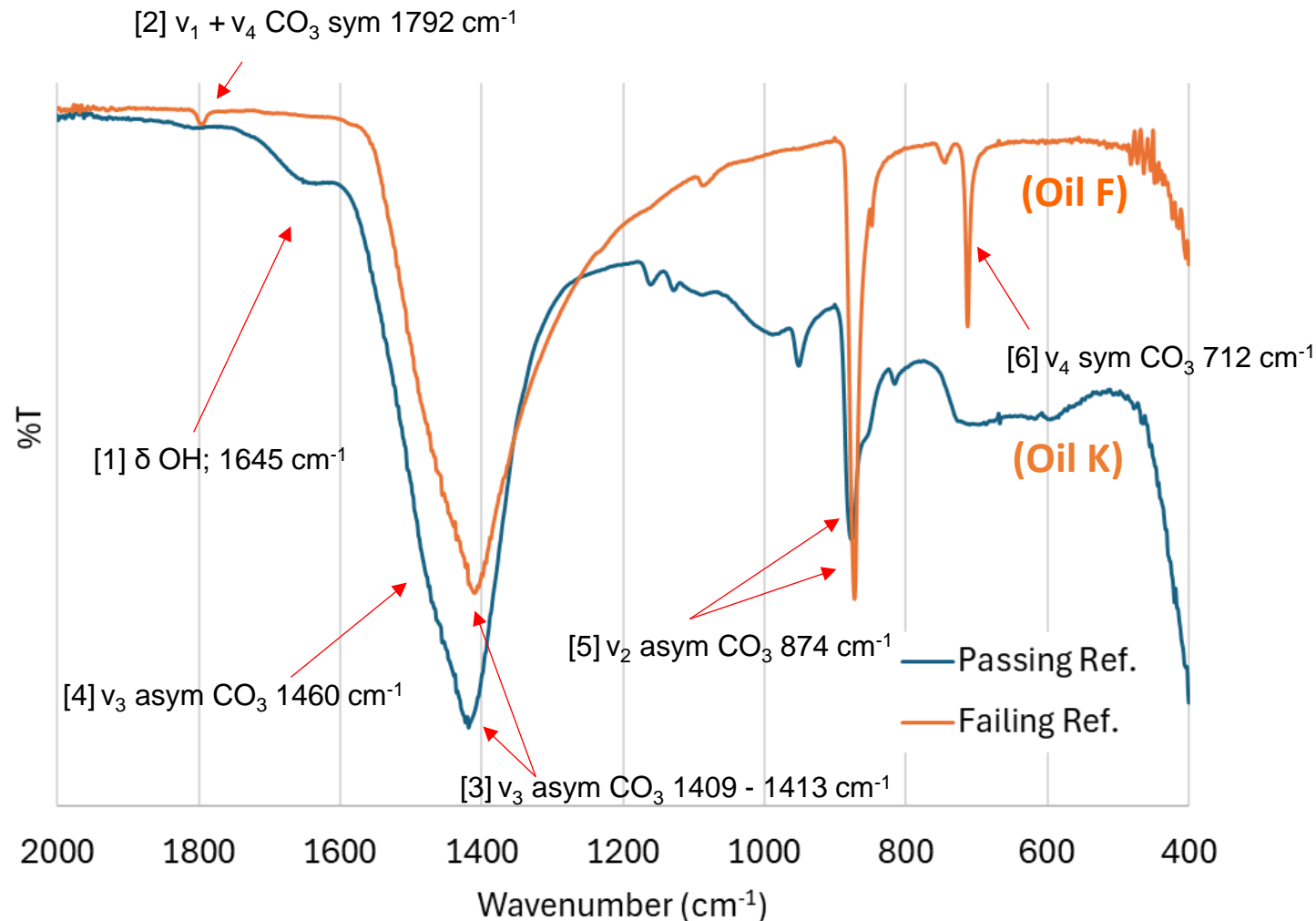


EOGT Sample (Oil F)



- FTIR analysis of gel formed in the field and in EOGT (Oil F) both suggest the formation of crystalline calcium carbonate

Pass-Fail EOGT FTIR Analysis



*Reference Spectra

Amorphous CaCO₃ interpretation (Passing)

- [1] Associated water with amorphous phase
 - [4] Slight shoulder at 1460 cm⁻¹
 - [5] Broadened shoulder at out-of-plane 874 cm⁻¹
 - [6] Absence of 712 cm⁻¹ only shown in calcite phase
- Note: May have some small amount of vaterite

Crystalline CaCO₃ interpretation (Failing)

- [1] Absence of associated water with amorphous phase
- [4] No shoulder at 1460 cm⁻¹
- [5] Sharp peak at out-of-plane 874 cm⁻¹
- [6] Sharp peak at 712 cm⁻¹ only shown in calcite phase

*Rodriguez-Blanco, J. D., Shaw, S., and Benning, L. G. (2011) The kinetics and mechanisms of amorphous calcium carbonate (ACC) crystallization to calcite, via vaterite. *Nanoscale*, 3, 265–271.

Draft Timeline – updated May 12, 2025

Draft Timeline	Date													
	5-6 2023	7-8 2023	9-10 2023	11-12 2023	1-2 2024	3-4 2024	5-6 2024	7-8 2024	9-10 2024	11-12 2024	Jan-Feb 2025	Mar-Apr 2025	May-June 2025	Jul-Aug 2025
Develop test procedure and ILS report form	█													
Collect and prepare donated oil samples (17 oils)		█												
Screening samples shipped to labs (6 labs)		█												
Screening labs run 4 tests			█											
Test development (Screening, Proposal tests, Root cause)			█											
Pilot #1									█					
Pilot #2 and #3									█					
ILS samples shipped and labs run tests											█	█	█	
Data analysis for ILS, generate Research Report (RR) & Precision													█	█
Ballot test procedure and RR														█
Test available for industry use														█

Action Items and Next Meeting

- Richful and Savant to run Pilot II and send data to Yongli, Jared, and John L
- Infineum and Afton to complete ILS runs
- Yongli to update membership

- Next Meeting: Thur June 12 at 9AM CDT for 1 hr



Thank you for your support!

Participants		
Method Development (11)	Oil Donations (9)	Testing Labs (10)
Afton	Afton	Afton
ExxonMobil	Ford	Infineum
Ford	Infineum	Intertek
Infineum	Lubrizol	ISP
Intertek	OH Technologies (donate filters only)	Lubrizol
ISP	Oronite	Richful
Lubrizol	Subaru	Savant
Oronite	TMC (collection, shipping only)	SwRI
Savant	Toyota	TMC (monitoring system only)
SwRI		Valvoline
TMC		

