

ASTM Engine Oil Gelation Test (EOGT) WK86363 Update

EOFT and EOWTT Surveillance Panel Meeting

November 13, 2024

Yong-Li McFarland, Chair



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EOFT and EOWTT Surveillance Panel Membership

22 members

Beth Schwab, Afton Chemical

Michael Kunselman, Center for Quality Assurance

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

Maggie Smerdon, Savant Labs

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
- Current status:
 - Method: 1 draft (Afton method) uploaded on ASTM Collaboration Area
 - Oils: 11 potential reference oils offered; 17 oils received at TMC
 - Screening Tests and ILS: Screening Test and additional tests ongoing
 - Timing: ILS tests to be run by **March**, and test available in **June 2025**



Agenda

- EOGT Workshop
- Afton EOGT updates from labs
 - Savant
 - Intertek
 - Valvoline
 - ?
- Pilot I Results: SwRI and Afton
- Pilot II Plans



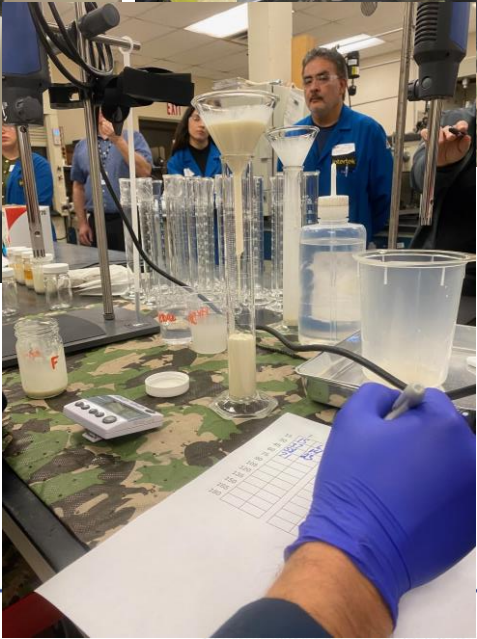
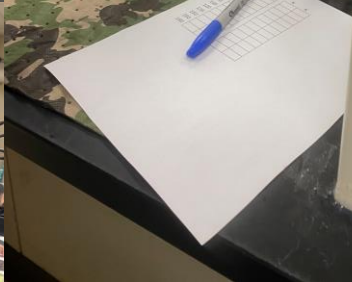
EOGT Workshop

- 14 Attendees from Valvoline, Intertek, Afton, Chevron Oronite, Infineum, Ford, Lubrizol, and SwRI
- Where: SwRI, San Antonio, TX
- When: Oct 28-29, 2024
- What: Review Afton EOGT method
- Accomplishments: Afton and SwRI demonstrated the EOGT Method, participants prepared samples and used the shearing tool on previous and current samples, updated draft procedure, created a report form, and made plans for Pilot studies 1-3 before ILS

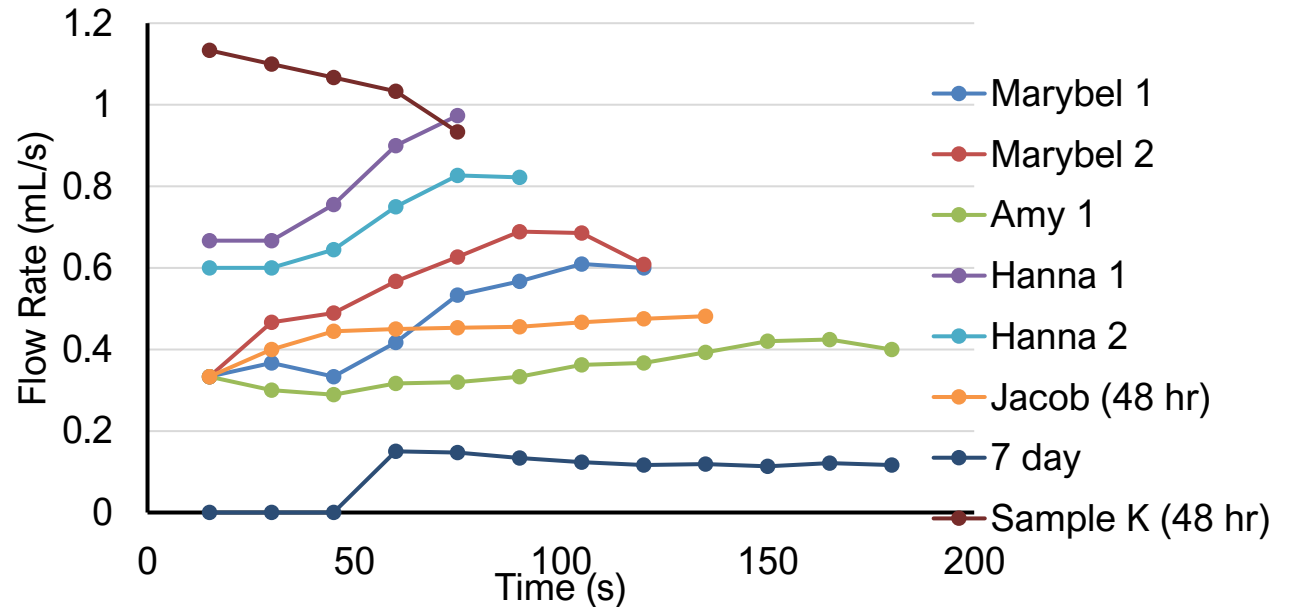
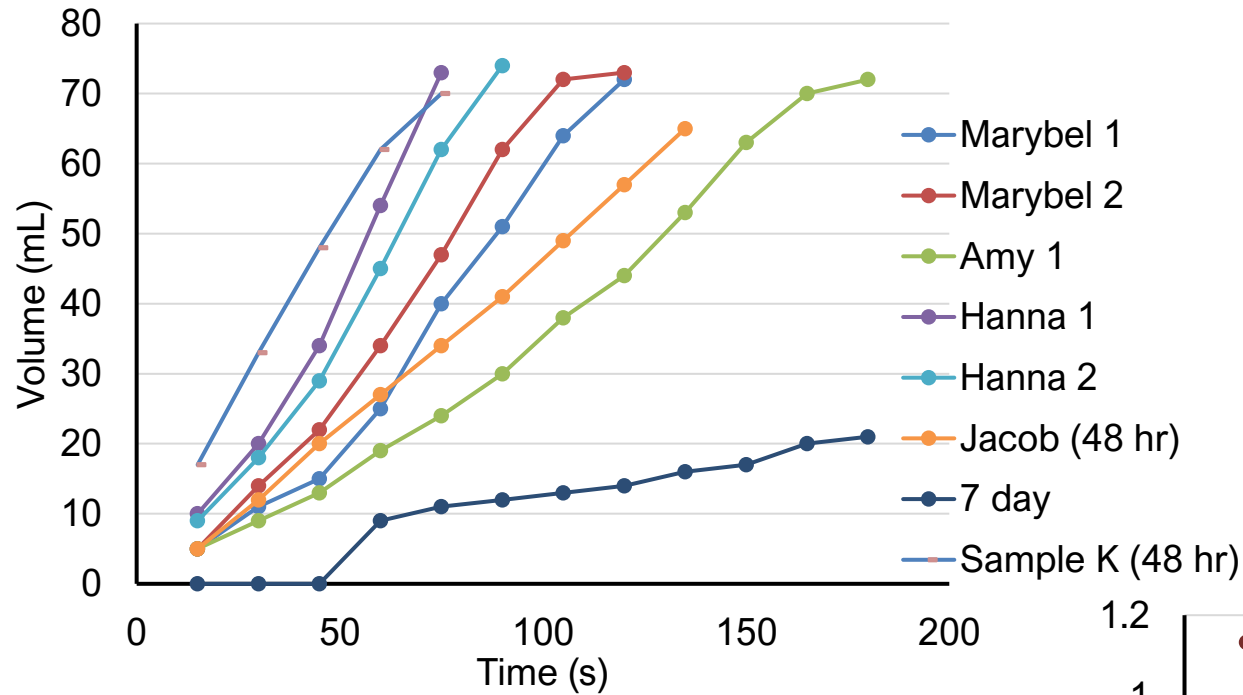


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Workshop photos



Workshop Day 2 data



Pilot 1, 2, 3

Pilot # 1				
Storage Duration (days)	High Shear Speed (rpm)	High shear duration (sec)	Run #	Sample
3	14K	60	1	Oil F
3	14K	90	2	Oil F
3	16K	60	3	Oil F
3	16K	90	4	Oil F
5	14K	90	5	Oil F
7	14K	90	6	Oil F
3	10K	90 sec, no 7K step	7	Oil F
?	?	?	8	Oil K

Pilot # 1: Afton and SwRI to run Pilot #1 runs 1-7, determine conditions for #8, and run #8. Also recommend what results to report. Each run will be in duplicate.

- Compare data and create Tier 1, 2, 3 conditions for most stable "mayo" consistency
- Run additional conditions as needed

Pilot #2				
	Labs	Conditions	Technician	Sample
	Afton	?	1	F
	Intertek	?	2	K
	Savant	?		
	SwRI	?		
	Valvoline	?		

Pilot #2: ILS labs run Oil F and K with preferably 2 techs, each 1 set of duplicate tests, under optimized Pilot #1 conditions

- Review data and change procedure wording or update conditions

Pilot # 3				
	Labs	Conditions		Sample
	Afton	?		Oil 1
	SwRI	?		Oil 2
				Oil 3
				?

Pilot # 3: SwRI and Afton run potential reference oils to select samples for ILS



See Draft Report Form



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Afton Method Updates

- Afton: Pilot I results shared; sheared out samples and intermediate gel were seen, will run Pilot II with both tips by 11/22
- SwRI: Pilot I results shared; resheared samples had 0.05-0.06 ml/s flow; tried shaking sample and then reshear-didn't work, need to have full water layer separate to reshear or will not gel; will run Pilot II with both tips by 12/2
- Savant: no update
- Intertek: able to run Pilot II by 11/22
- Valvoline: able to run Pilot II by 12/2
- Infineum: waiting for 18G tip to arrive for Pilot II
- Lubrizol: waiting for equipment to arrive to run Pilot II

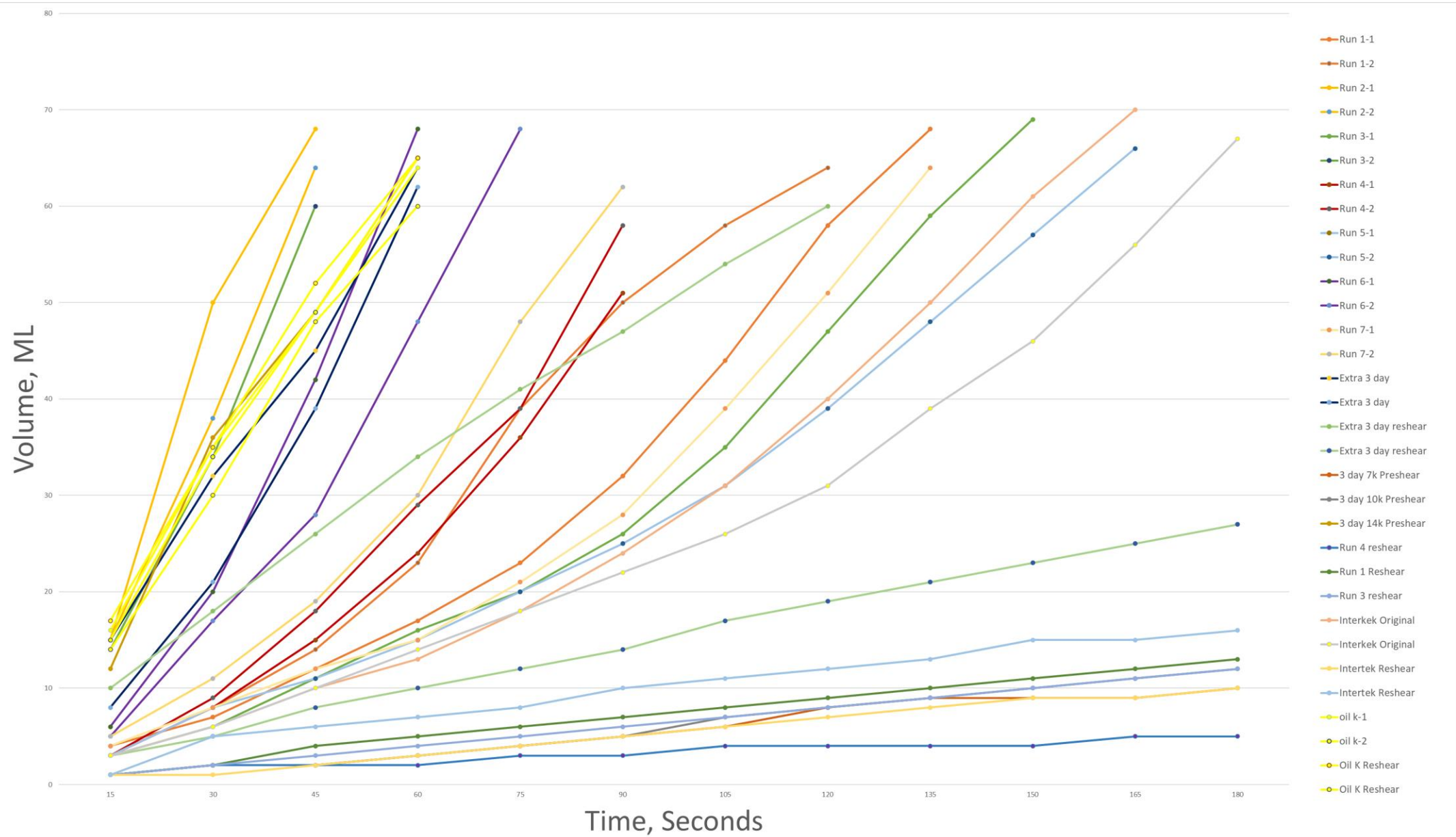


Afton Pilot I Data –Nov 13, 2024



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SwRI Pilot I Data



ILS Planning

- Criteria for Afton method to moving forward to ILS: Root cause group to finalize method, specifically on shearing details; Ford to give recommendation to move forward
- Sample volume: 120 mL for duplicate run per oil
- Labs participating: Afton, Savant, SwRI, Valvoline, Intertek, ISP?, Infineum?
 - Others?
- Will EOGT be TMC monitored (like EOFT D6795) or not (like D7563)?
 - Yes needs to be TMC monitored like D6795 with a quantitative result/acceptance limit on reference oil, based on ACC code of practice and/or Test Readiness recommendations, may need to be run in duplicate for reference oil. Method will include TMC inclusion and LTMS will include reference criteria for this test. Will wait on referencing period once more data comes in.



ILS Planning

- Goals: Establish precision (repeatability and reproducibility) statement with different levels of performance and different operators
- ILS: Assume 6 labs, 6 oils, each lab runs 12 tests total (each oil run twice, consider more repeats?)
- We have 11 oils eligible as reference oils and 6 additional oils at TMC
 - Ask oil participants to select down to 6 fluids total. Optimal: 2 good, 2 bad, 2 borderline oils.
 - Consider send out 17 offered oils to 3 labs to run 1 test each and determine if there's any borderline fluids to include in ILS. Propose each lab to run Oil F and 5 samples and then group to select down to 2 good, 2 fail, 2 borderline (if possible). There will be some lab bias.
- Travis to come up final test matrix once oils are determined
- Procedure notes:
 - All labs should prove they can gel (2?) poor oils before being included in ILS
 - Take sample and report every 15 sec volume up to 180 sec and then determine what to report
 - Include range of Vis grade samples, check with TMC on info supplied
 - Consider combine ILS with BOI-VGRA matrix: three technologies from at least 2 companies in different vis grades and base oils



Oil Matrix –updated Oct 6, 2023 – Are these oils still relevant??

Participants	Potential Reference Oils Offered	Oil Sample Received at TMC	Comments
Ford	2 oils (low and high known performance oils) - eligible to be reference oils	2 oil samples received	
Toyota	2 oils - not eligible to be reference oil	2 oil samples received	Offer 2 field samples for later testing; Awaiting some Physical and Chemical data
Afton	4 oils– eligible to be reference oils	4 oil samples received	
Lubrizol	4 oils – eligible to be reference oils	4 oil samples received	
Infineum	1 oil – eligible to be reference oil	1 oil sample received	
Oronite	3 oils –not eligible to be reference oils	3 oil samples received	Awaiting Physical and Chemical data
Subaru	1 oil – not eligible to be reference oil	1 oil sample received	Offer 1 field sample for later testing
Total Oils	<u>11 potential reference oils confirmed</u>	<u>17 oils received</u>	

John Loop to manage Sample Information – Notes 10-28-24: Samples will have to be resubmitted by suppliers



Draft Timeline – updated Oct 29, 2024

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	Nov-Dec 2024	Jan-Feb 2025	Mar-Apr 2025	May-June 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

- ~~Group to review TBN results on fresh and EOT samples.~~
 - Yongli to send out updated Pilot II procedure by email and posting to Collaboration Area
 - Afton, SwRI, Valvoline, Intertek, Infineum, and Lubrizol to run Pilot II
 - Check if Savant wants to participate in Pilot II and if so, when can we get results
 - Ford (Mike or Rob) to help determine which oil samples we should consider for ILS and work with participants on providing those samples
 - Afton to send out Pilot I data
-
- Next Meeting: Tuesday Dec 3 at 9AM CST for 1 hr



Thank you for your support!

Participants		
Method Development (11)	Oil Donations (9)	Testing Labs (7)
Afton ExxonMobil Ford Infineum Intertek ISP Lubrizol Oronite Savant SwRI TMC	Afton Ford Infineum Lubrizol OH Technologies (donate filters only) Oronite Subaru TMC (collection, shipping only) Toyota	Afton Intertek ISP Savant SwRI TMC (monitoring system only) Valvoline

