

ASTM New Engine Oil Gelation Test (EOGT) WK86363 Update

EOFT and EOWTT Surveillance Panel Meeting

October 9, 2023

Yong-Li McFarland, Chair



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EOFT and EOWTT Surveillance Panel Membership

20 members

Beth Schwab, Afton Chemical

Michael Kunselman, Center for Quality Assurance

Robert Stockwell, Chevron Oronite

Dennis Gaal, Exxonmobil

Michael Deegan, Ford

Ron Shah, Infineum

Joe Franklin, Intertek

Karina Gil, 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: 2 drafts (large volume (600g) and small volume (200 g)) uploaded on ASTM Collaboration Area, email Jared with procedure questions
 - Oils: **11** potential reference oils offered; 17 oils received at TMC
 - Screening Tests, Pilot Study, and ILS: Wait on 1 lab Screening Test results, start additional Proposal testing
 - Timing: Pilot Study tests run by February, ILS tests to be run by June, and final method ballot in July or August 2024



Oil Matrix

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



Testing Status – updated Oct 6

[EOGT report form Rev 6](#)

Test Phase	Description	Status	Comments
1. Screening Tests	<p>-4 tests; 2 oils: low performance oil in duplicate, high performance oil in duplicate; 6 labs</p> <p>-Run LV method</p> <p>-Intent: check labs can run test as set up</p>	-Valvoline: complete tests by end Sept, send data by end Sept	<p>Run SOT & 14 day EOT only.</p> <p>-REVIEW data and start Proposal tests</p>
2. Pilot Study	<p>-? Tests; ? Oils; 4 labs</p> <p>-Run SV and LV methods, all intervals</p> <p>-Intent: determine samples, method, and intervals for procedure and ILS</p>	<p>Waiting to determine samples:</p> <p>-Plan to include either 6 or 10 oils including 2 performance oils, and then each of the other oil participants select 1 or 2 “borderline” oil for total of 6 or 10 oils to run. “Borderline” is something that would fall in-between the 2 performance oils (less Ca than Oil F?)</p> <p>-Pros/cons: 6 oils – shorter to run, but may not find a borderline reference and may need another Pilot run; 10 oils-longer to run, but more likely to find a borderline reference</p>	Group to decide as we move forward
3. Interlaboratory Study (ILS)	<p>-? Tests; ? Oils; 6 labs</p> <p>-Run _ method</p> <p>-Intent: generate repeatability and reproducibility data on samples, determine at least 2 reference oils</p>	Waiting to determine samples	

Labs Only Meeting (Oct 2) comments

- Goal: adjust testing at labs to be more like ISP or propose a more robust/severe test to distinguish between the 2 performance oils
 - Can pouring out into 4 containers vs 1 container or plastic vs glass container make a difference and how it may impact filterability
 - Storage temp: 23C +/-2C currently done; storage containers are closed
 - Try to use batch 22 for filters
 - Focus on CO2 bubbling and heating aspect: **ISP** to provide a short video of heating and CO2 bubbling set up including time for heating before CO2 start, estimate timing between stopping CO2 and pouring into storage container
 - **ISP** to provide any info on different water % run data
 - **Is the gel layer or amorphous on top or bottom**
-
- Afton and ISP needs more oil for above proposals
 - TMC shipped 2 oils (4 samples) to all labs, to arrive by Oct 10 to all labs
 - Timing: ISP send video by ASAP; group approval on Proposals and ~3-4 weeks to complete



Labs Only Meeting (Oct 2) comments continued

- Proposals: (all complete data report form) – All 8 proposals approved by group on Oct 9.
- 1. Filterability of just the bottom sediment layer: need procedure (2 oils) – Afton; how to make sure there's enough sample if sediment amount changes, and make sure all labs can duplicate
- 2. Include 0 hr filterability: ISP on existing samples (2 oils) – homogenized water into new oil, no heating or CO₂
- 3. Run Reference oil 79 (EOWT(3%):-2 to 18, EOFT: 27 to 45) or 77-3 (EOWT(3%): -5 to -15) in EOGT: ISP (to include glass jars with plastic containers) and Afton to run oils 79 and 77-3- shakedown runs from TMC
- 4. Running with higher water %: Savant and Intertek to run 8% water pending ISP previous data info (2 oils) – Is this overly severe and not field-relevant?
- 5. Characterize gel: Savant, Valvoline -COF (coefficient of friction), FTIR of separate layers, microscope; viscosity (cone & plate); particle size; limited sample of gel, may need order of which property to perform first
- 6. Centrifuge stored sample before running filterability: SwRI to check, would centrifuge help or hurt gel formation?, centrifuge for ICP and KV and then homogenize before filterability
- 7. Run EOGT without homogenizing EOT sample before filterability- Tricky to repeat; Intertek
- 8. Increase CO₂ bubbling time to 4 hrs: SwRI?
- Look at Ca % change in New oil, 0hr, and EOT



Next Steps

- Remaining lab run Screening tests (LV tests on high and low performance oils).
- Group to review updated Screening Test data and for labs to run additional Proposal Tests
- On Hold-Determine Pilot Study samples (# and which samples, and # repeats), and method (LV, SV, all intervals)
- On Hold- Send out Pilot Study samples to Pilot Study labs
- On Hold- Labs run Pilot Study



Thank you for your support!

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

