ASTM Engine Oil Gelation Test (EOGT) WK86363 Update

EOFT and EOWTT Surveillance Panel Meeting

October 1, 2025

Yong-Li McFarland, Chair

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EOFT and EOWTT Surveillance Panel Membership

21 members

Sarah Fitzgerald, Afton Chemical
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
Michael Kunselman, KJA Group
Litchi Xie, Lubrizol Additive (Zhuhai) Co., Ltd.
Victoria Fein, Lubrizol
Jason Bowden, OH Technologies Inc
Clarence McCollum, Richful (Xinxiang Richful)
Greg Miiller, Savant Group
Sean Alston, SGS North America
Becky Grinfield, SwRI
Yong-Li McFarland*, SwRI
John Loop, TMC
Jared Cavaliere, Valvoline

*Chair

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 V9.7) 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 August, and test available in October 2025

Agenda:

- 1. Additional ILS data?
- 2. Check temp before and after shearing – additional info?
- 3. Reference process decision

ILS Updates – any additional data?

- Afton: completed ILS
- SwRI: completed ILS
- Savant: completed ILS, plan to start Oct 6
- Intertek: completed ILS
- Valvoline: completed ILS
- Infineum: completed ILS
- Lubrizol: completed ILS
- Richful: completed ILS

ILS Data Decision

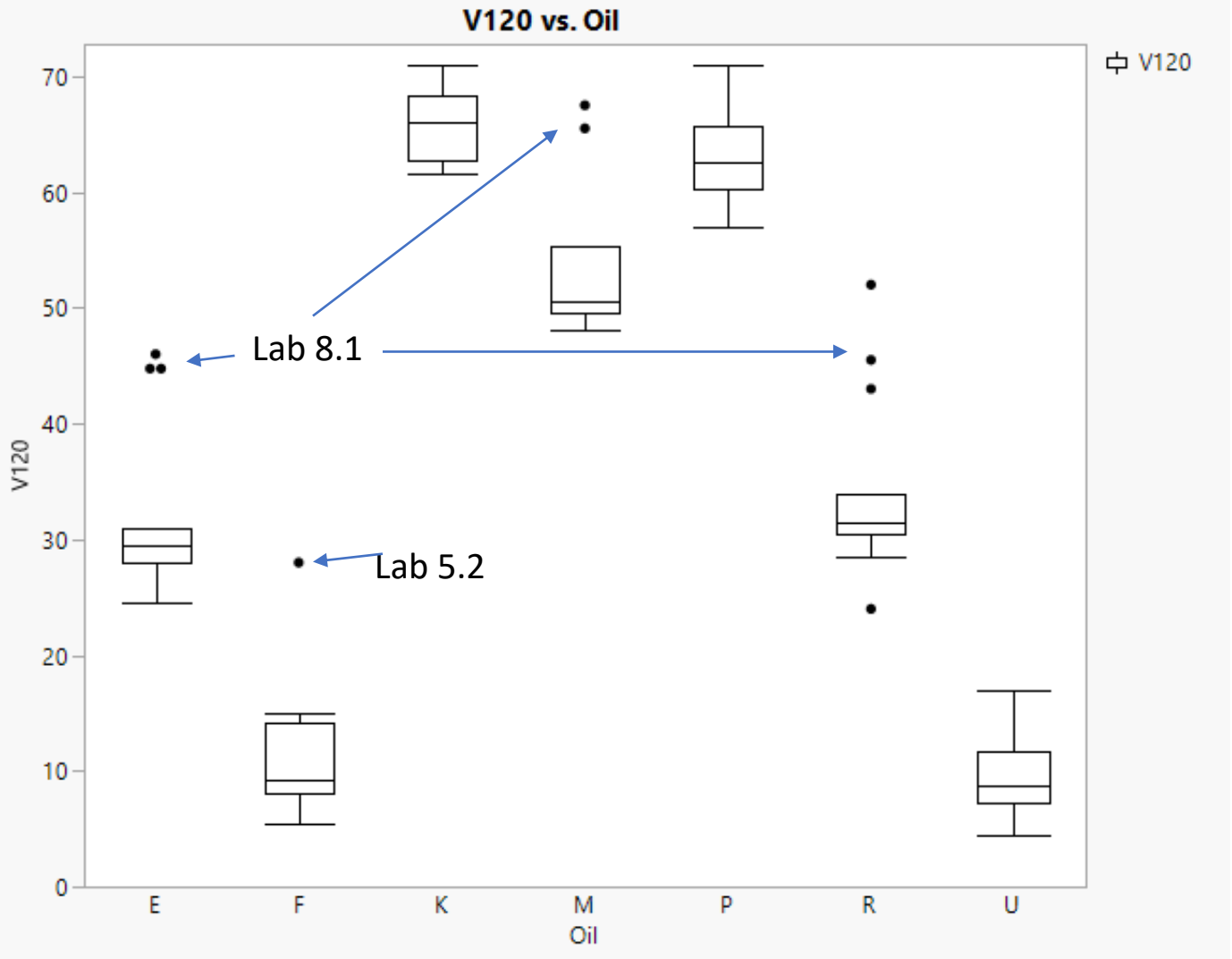
- ILS objectives:
  - 1) Determine report value: *Report the average volume at 120 s*
  - 2) Establish precision (determinability, repeatability, and reproducibility) statement
  - 3) Select reference oil(s) for test: *One of the Oil X, Y, Z reference oils to be run with each batch of candidate samples*
- Review EOGT Analysis Slides

- Options:
  - 1) Include all 8 labs' data in ILS data analysis
  - 2) Include labs meeting funnel ID data (Labs, 1.1, 3.1, 5.2, 7.1, 8.1) in ILS data analysis
  - 3) Select labs (Labs 1.1, 3.1, 5.2, 7.1) data in ILS target generation
  - 4) Rerun ILS for all labs

Slide from EOGT Analysis slides

Boxplots of Volume (ml) at 120 Seconds

- Valid Determinability Data



Slide from EOGT Analysis slides

Estimates

Parameter	Target	Oil F	Oil U	Oil E	Oil R	Oil K	Oil M	Oil P
Labs 1, 3, 5, 7, 8								
Volume at 120s (ml)	s_r	5.385	2.197	1.633	2.994		1.14	
Volume at 120s (ml)	s_R	7.296	3.935	7.494	7.703		7.413	
Volume at 120s (ml)	r	15.231	6.2141	4.6188	8.4683		3.2244	
Volume at 120s (ml)	R	20.636	11.13	21.196	21.787		20.967	

Parameter	Target	Oil F	Oil U	Oil E	Oil R	Oil K	Oil M	Oil P
Labs 1, 3, 5, 7								
Volume at 120s (ml)	s_r	5.385	2.001	1.785	2.411	2.990	1.061	2.652
Volume at 120s (ml)	s_R	7.801	3.978	1.785	2.665	2.990	1.208	2.652
Volume at 120s (ml)	r	15.231	5.660	5.049	6.819	8.457	3.001	7.501
Volume at 120s (ml)	R	22.065	11.251	5.049	7.538	8.457	3.417	7.501

Parameter	Target	Oil F	Oil U	Oil E	Oil R	Oil K	Oil M	Oil P
Labs 1, 3, 5 (not for Oils F and U), 7								
Volume at 120s (ml)	LS Mean	8.452	8.257	28.750	30.875	64.500	50.125	61.313
Volume at 120s (ml)	s_r	1.118	1.969	1.785	2.411	2.990	1.061	2.652
Volume at 120s (ml)	s_R	2.391	1.969	1.785	2.665	2.990	1.208	2.652
Volume at 120s (ml)	r	3.162	5.569	5.049	6.819	8.457	3.001	7.501
Volume at 120s (ml)	R	6.763	5.569	5.049	7.538	8.457	3.417	7.501

Slide from EOGT Analysis slides

Referencing/Calibration Options

1. LTMS Type System for Oils F(Slow), E (Mid), K(Fast) and/or M (Fast) with Severity Adjustments
2. Simple Go/No Go for Oils F(Slow), E (Mid), K(Fast) and/or M (Fast)
3. Options to Monitor the Difference Between Oil F and Oil K
   i. (Oil K – Oil F Target) = (64.5 – 8.452) +- 2*SQRT(1.118^2 + 2.990^2)
   ii. (Oil K – Oil F Target) = (64.5 – 8.452) +- 2*SQRT(2*2.990^2)
   iii. (Oil K – Oil F Target) > 8.5 (Oil K Repeatability/Reproducibility)
4. Options to Monitor the Difference Between Oil F and Oil E
   i. (Oil E – Oil F Target) = (28.75 – 8.452) +- 2*SQRT(1.118^2 + 1.785^2)
   ii. (Oil E – Oil F Target) = (28.75 – 8.452) +- 2*SQRT(2*1.785^2)
   iii. (Oil E – Oil F Target) > 5.05 (Oil E Repeatability/Reproducibility)

Ford response

- Would like to see passing oil be significantly better than Oil F performance
- Potentially want 2SD or 3SD better than Oil F

ILS Oils Inventory

Oil Name	Available as Reference Oil	Amount (gallons)	Comments
EOGT-F	Yes	3	(reblend available but not yet tested)
EOGT-U	No	9	
EOGT-E	No	8	
EOGT-R	No	9	
EOGT-K	Yes	0	(reblend available but not yet tested)
EOGT-M	Yes	9	
EOGT-P	Yes	9	

Reference process options

- Determinability: "any difference between duplicate runs 1 and 2 > 8.2 at 120 s would be invalid"
- Option 1: Acceptance limit 2 ref oil system for Oils F(Slow), ~~R (Mid),~~ K or M(Fast) with Severity Adjustments
- Option 2: Acceptance limits 2 ref oil system for Oils F(Slow), ~~R (Mid),~~ K or M(Fast)
- Option 3: Monitor the Difference Between Oil F and Oil M (2 votes)
    - i. ~~3a: (Oil M – Oil F Target) = (50.1 – 8.452) +/- 2*SQRT(1.118^2 + 2.990^2) = 35.2 and 48.0~~
    - ii. 3b: (Oil M – Oil F Target) = (50.1 – 8.452) +/- 2*SQRT(2*2.990^2)= 33.2 and 51.1
    - iii. 3c: (Oil M – Oil F Target) > N (N is to determined, N= 33) Labs to check how many of ILS runs would pass
- ~~Option 4: Monitor the Difference Between Oil F and Oil E~~
    - ~~i. 4a: (Oil E – Oil F Target) = (28.75 – 8.452) +/- 2*SQRT(1.118^2 + 1.785^2)= 16.08 and 24.51~~
    - ~~ii. 4b: (Oil E – Oil F Target) = (28.75 – 8.452) +/- 2*SQRT(2*1.785^2)=15.25 and 25.35~~
    - ~~iii. 4c:(Oil E – Oil F Target) > Y (Y is to be determined)~~
- Would like to consider re-evaluating referencing process and precision as needed, feedback would be needed from spec setting groups
- Batch or time based referencing?

Temperature of Sheared Samples

Run #	Before Shearing Temp (°C)	After Shearing Temp (°C)	Temp Increase (°C)	
1	22.5	33.0	10.5	1st sample, did not gel
2	22.6	33.5	10.9	
3	22.8	37.5	14.7	2nd sample, slight gel
4	22.8	37.3	14.5	
5	22.8	39.6	16.8	3rd sample, serious gel
6	22.8	39.8	17	

From another lab

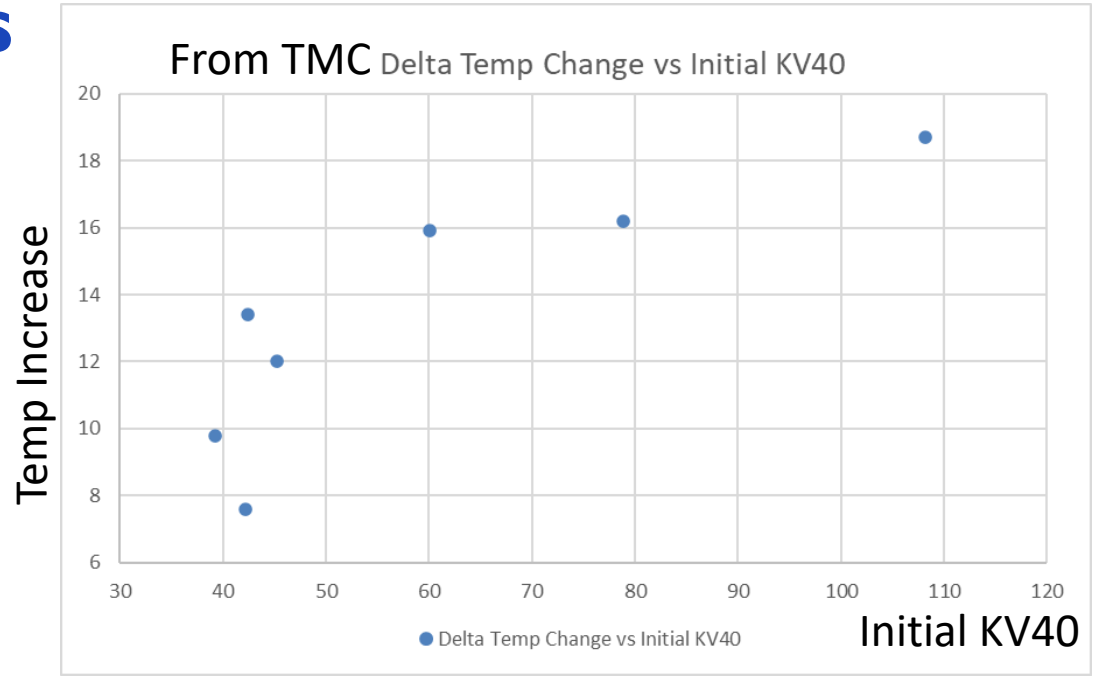
Oil	Average Temperature Increase, °C
Oil U	7.6
Oil F	9.8
Oil P	12
Oil K	13.4
Oil M	15.9
Oil R	16.2
Oil E	18.7

From Intertek

Temperature of sheared samples

- From Intertek:

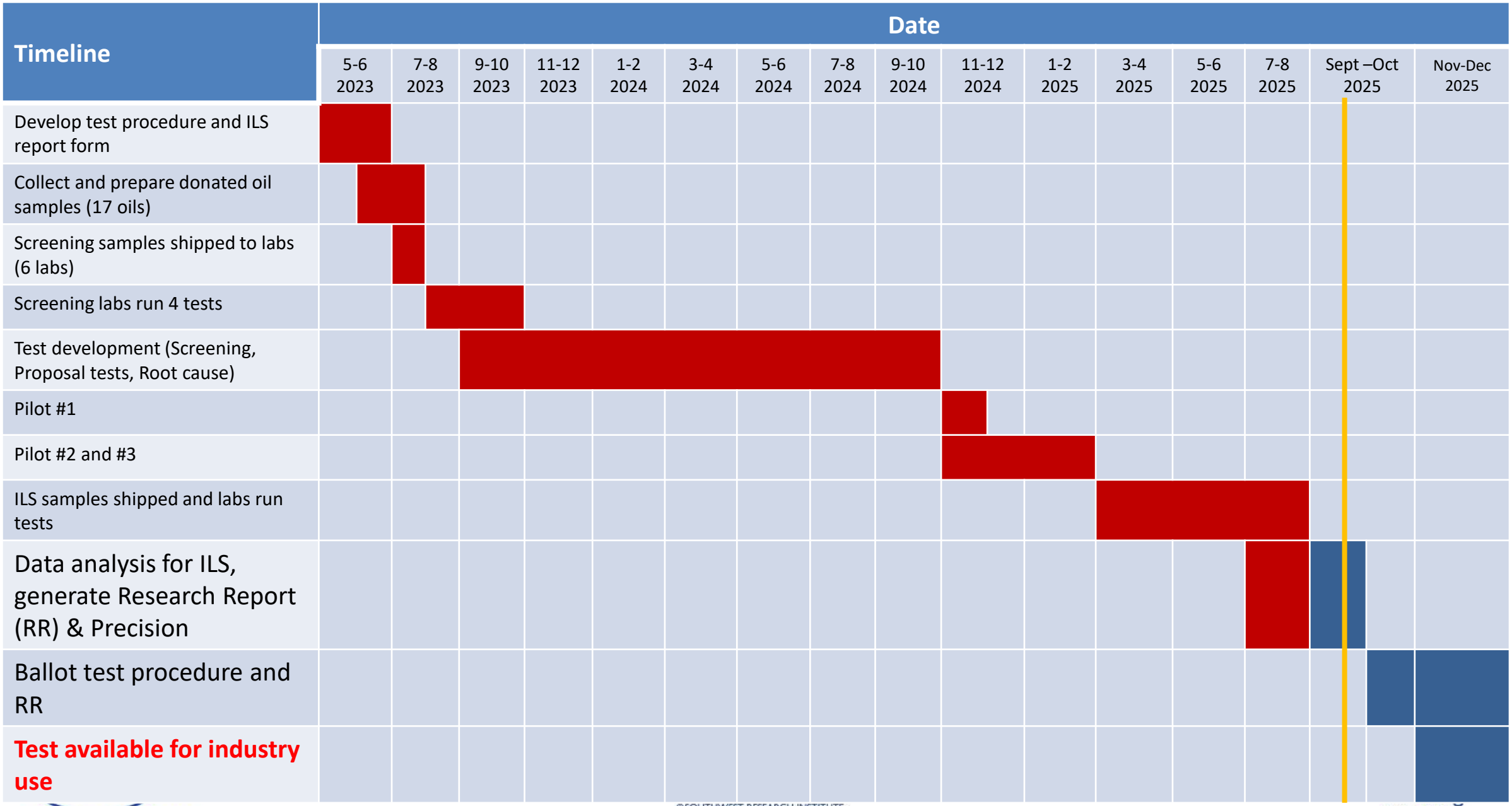
Oil	Average Temperature Increase, °C
Oil U	7.6
Oil F	9.8
Oil P	12
Oil K	13.4
Oil M	15.9
Oil R	16.2
Oil E	18.7



- The chart is color-coded according to the flow rate speeds; fast (green), mid (yellow) and slow (red).

- Notes for the temperature study:
- The sample size is different from that used in the shearing of the EOGT ILS due to the loss of sample from transferring from the graduated cylinder where flow rates were measured during the original run.
- Temperature measurements were done with a digital thermometer; the highest observed temperature reading was recorded for all oils.

Timeline – updated Sept 17, 2025



Action Items and Next Meeting

- Ongoing: Jared and John to work on data dictionary, all to give comments on procedure or video to Yong-Li, labs to review if data submitted accurately, let Yong-Li know of any precise funnel products and suppliers
- TMC and Statisticians review ILS data to see how many tests from each lab would pass a reference criteria of greater than 33 difference between Oil F and M data at 120s.
- All: review the Data analysis slides and decide on a preferred referencing/calibration interval (time- or batch-based) for your organization. We will discuss at the next meeting and make a group decision.
- Savant: update on ILS rerun
- Any lab: optional to perform temp checks before and after final shearing step on low, mid, and high flow oils
- Next Meeting: Thur Oct 23 at 9am CDT for 1.5 hr

Thank you for your support!

Participants		
Method Development (11)	Oil Donations (9)	Testing Labs (10)
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 Infineum Intertek ISP Lubrizol Richful Savant SwRI TMC (monitoring system only) Valvoline