

# Mack / Volvo Surveillance Panel Meeting

August 1, 2023

David Brass (chair)

# Agenda

- Mack T-11 Replacement Test Reference Oil
- Mack T-11 Replacement Procedure
- Volvo T-13 Reference Oil
- Mack T-12 Coordinated Reference Status
- AOB

# Mack T-11 Replacement Test

# Mack T-11 Replacement Reference Oil Request

Test	Viscosity Grade	Performance
Mack T-8/T-11 Replacement	10W-30 (~2.9 cP HTHS)	“F” Category Borderline

- EMA stated in February NCDT meeting that they are looking for viscosity growth performance similar to API CH-4 and would be amenable to using a delta viscosity measurement and not a relative viscosity measurement.
- API CH-4 Limits include:
  - Viscosity Growth of 11.5 cSt at 3.8% soot
  - Relative Viscosity of 2.1 with 50% shear loss at 4.8% soot
    - For a 10W-30 “F” Category viscosity (KV100 ~ 9.3-10.5 cSt) this would be ~10-11.5 cSt viscosity growth
- Without a set performance level for this parameter, the reference oil can only be set as approximately borderline.
  - This would mean **an oil that crosses the 11.5 cSt viscosity growth value somewhere around 4% soot.**
- EMA has asked for 0.10% max Phos, 0.35% max Sulf, 0.9% max SASH for PC-12
  - These limits were suggested to be used for reference oils and includes the tighter window of 0.08% max Phos, 0.3% max Sulf, 0.9% max SASH which was considered the tougher OEM target.
- A 5-year supply volume has been recommended for each of these reference oils (For the Mack T-11 Replacement requested volume is 1600 gallons)

# Mack T-11 Replacement “F” Category Reference Oil Offerings

Supplier	Test	%P	%S	%SASH	Viscosity Grade	HTHS	Base Stock Group
1	T-11 Rep	0.076	0.246	0.8	10W-30	2.9	II
3	T-11 Rep	0.08	0.32	0.88	10W-30	3.1	II

## Supplier 1

### Data Not Available

T-11 replacement oil results response from June 21:

We have scheduled the test and expect to have **results in the next 3-4 weeks**. We are trying to have results for the July 11<sup>th</sup> meeting but cannot guarantee. If we do not have results by July 11<sup>th</sup>, we do expect to have results shortly after.

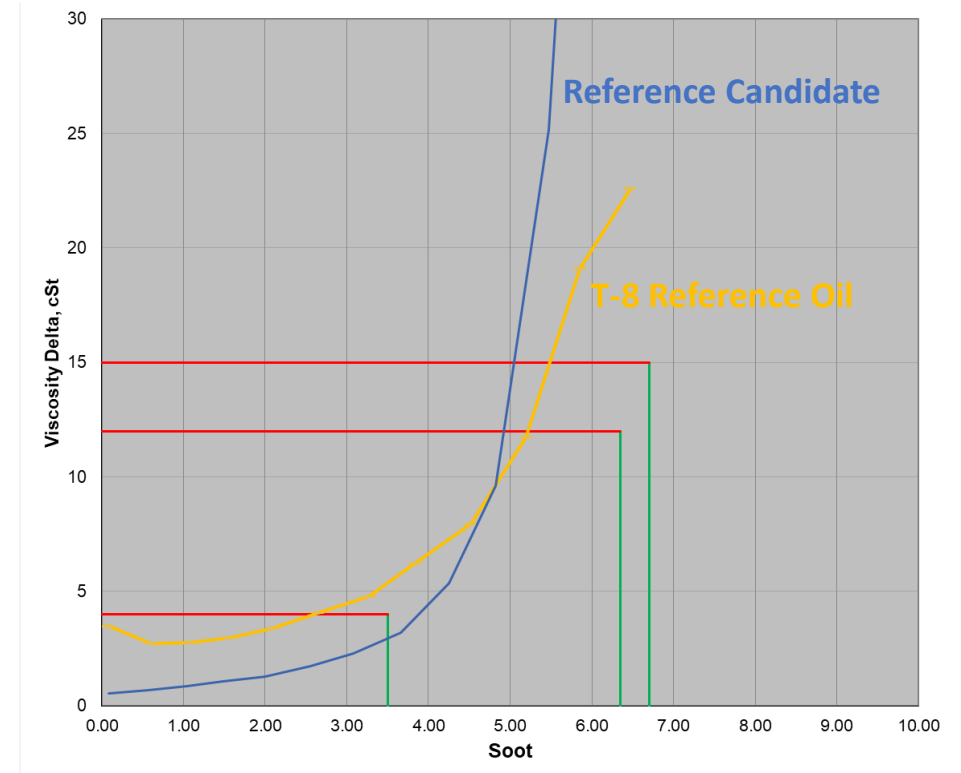
Suppliers was asked to supply data by July 11 to allow for the decision to be made on the reference oil at the Matrix Design TF meeting held on July 20. No data has been submitted by this supplier at this time.

T-11 replacement oil results response from July 26:

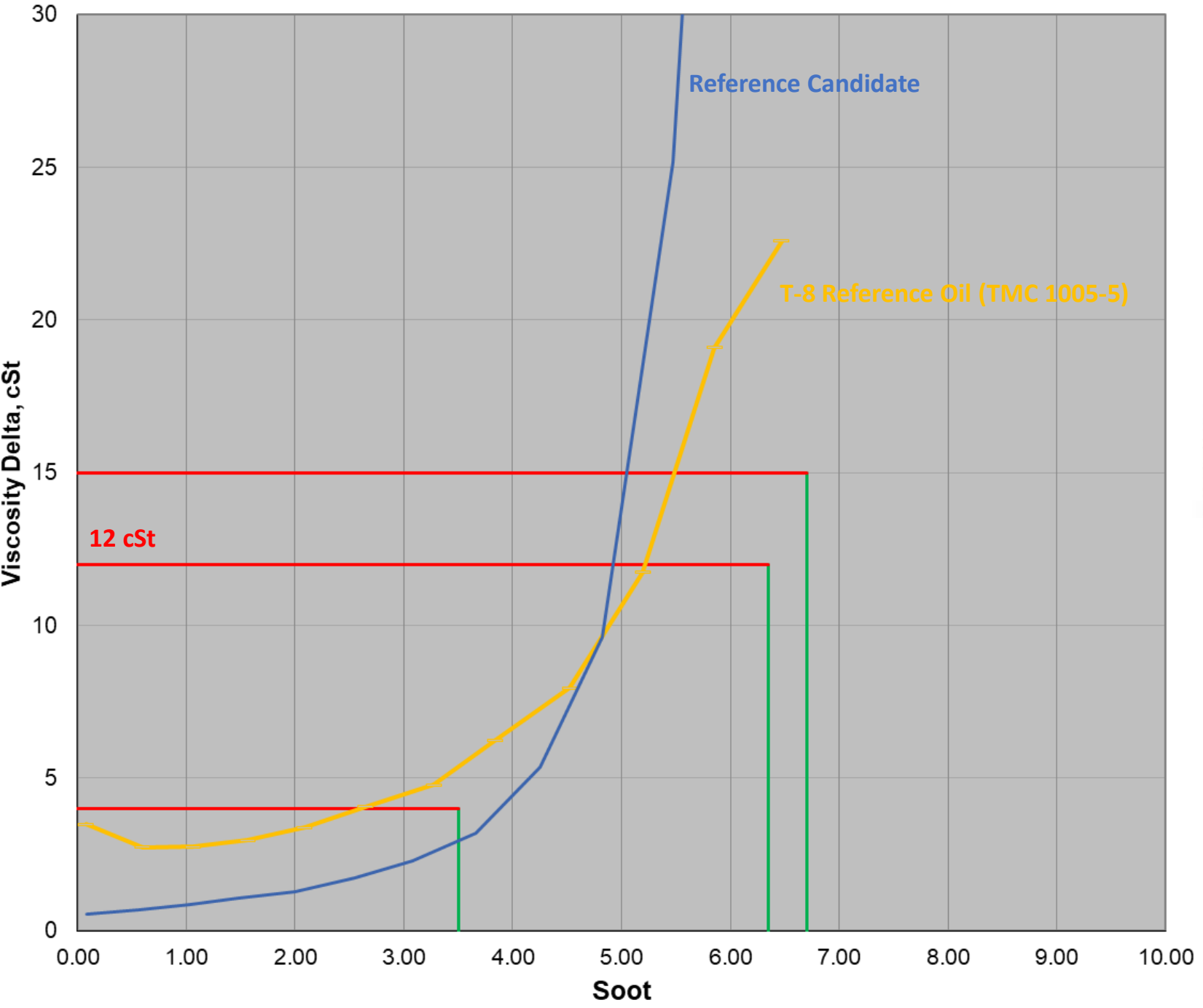
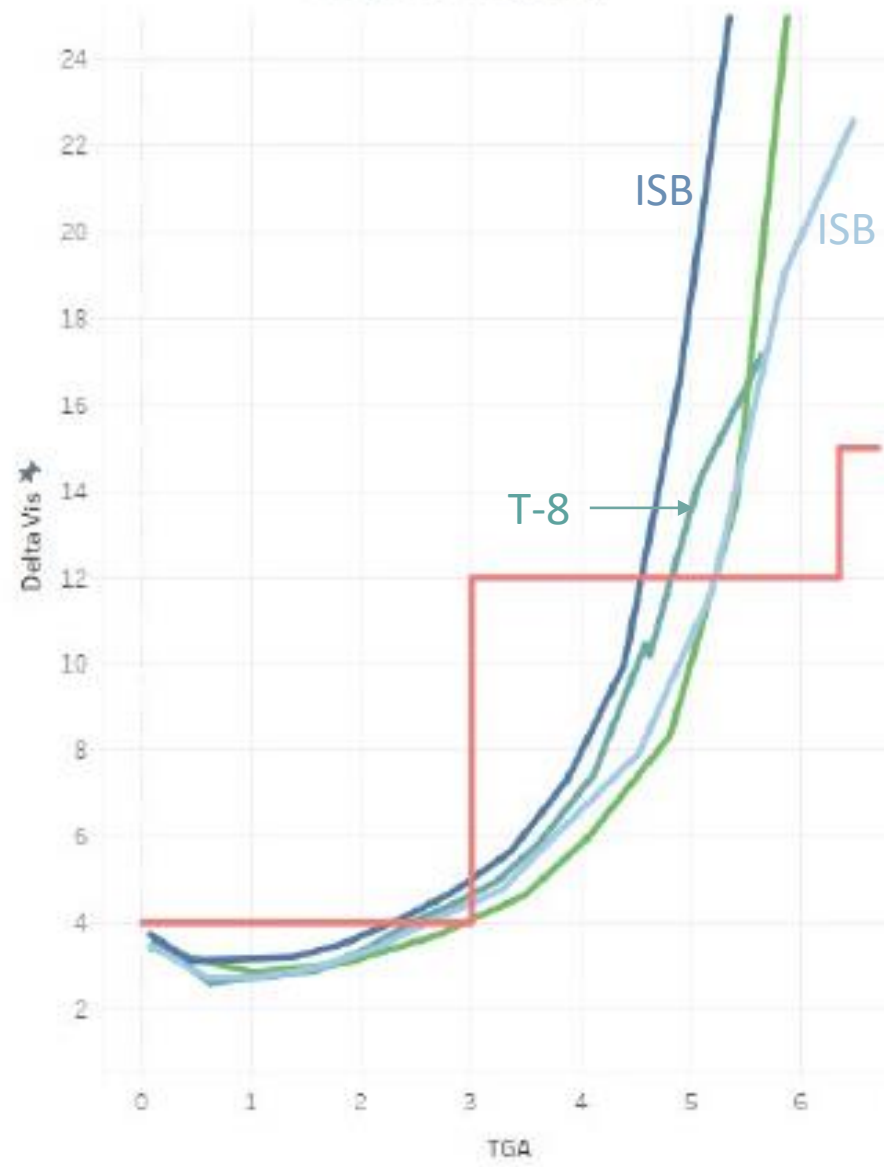
ISB Soot Vis is in the queue – we are expecting it will start this week and we should have results to share at the August meeting

## Supplier 3

Performance in Cummins ISB Viscosity Growth Test with a very similar technology (reference oil candidate has some minor modifications that would not affect performance in this test):

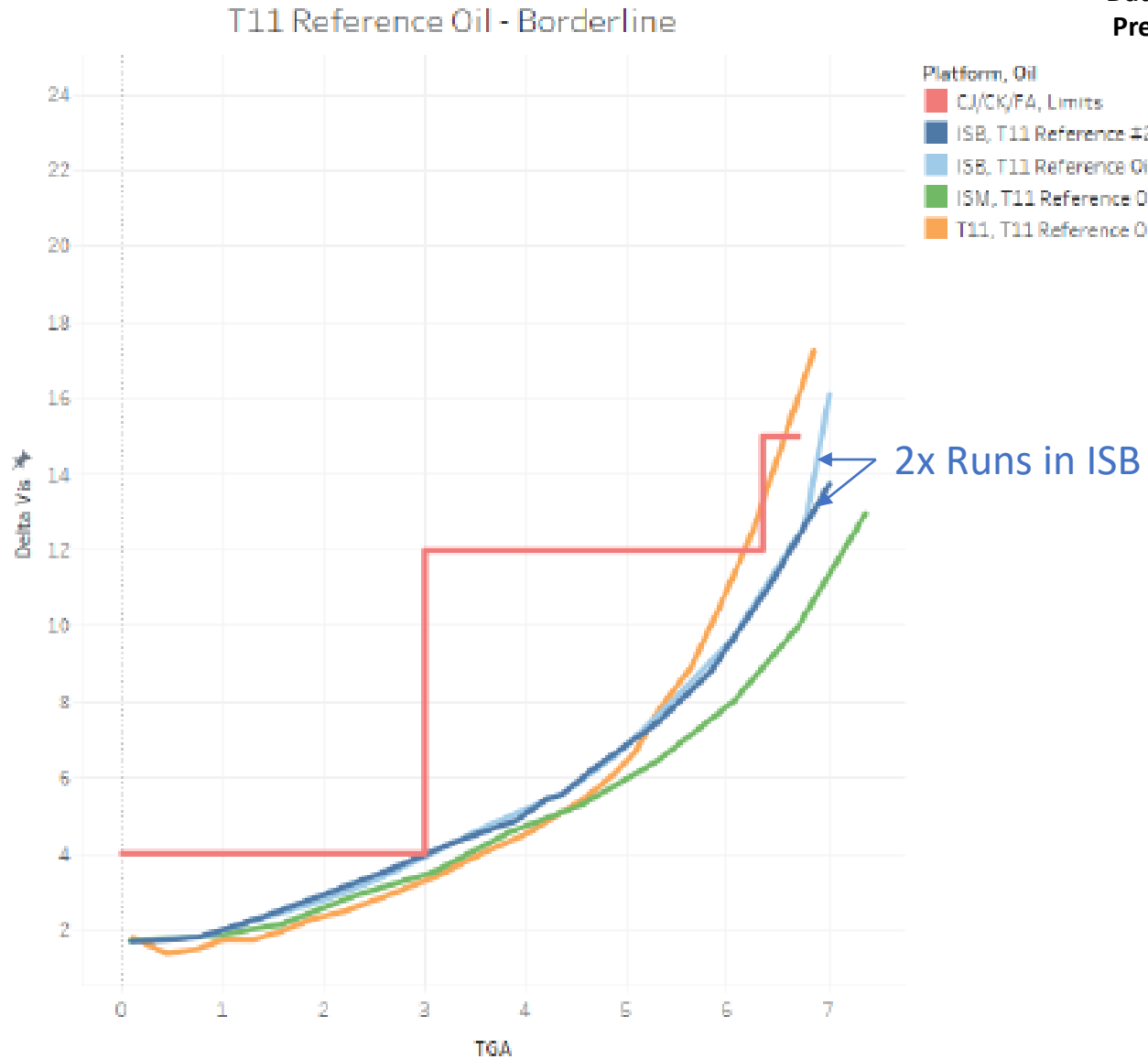


T8 Reference Oil



# Mack T-11 Reference Oil in Cummins ISB Viscosity Test

Data Taken from Mack T-11 Replacement Task Force  
Presentation from SWRI on 4/11/23



# Mack T-11 Replacement Procedure

Procedure available on TMC website:

- [www.astmtmc.org - /ftp/docs/diesel/cummins/procedure\\_and\\_ils/ISB Viscosity/](http://www.astmtmc.org - /ftp/docs/diesel/cummins/procedure_and_ils/ISB_Viscosity/)
- A request has been made for feedback from this surveillance panel on the procedure based on our knowledge of Mack T-8 and Mack T-11 engine tests.
- Feedback can be made directly to Bob Warden (SWRI) or delivered during Mack T-11 Replacement Development Meeting.



# Volvo T-13 Reference Oils

# Current Volvo T-13 Reference Oil

- Current reference oil for Volvo T-13 = 823/823-1

- Target of Reference Oil 823:

T-13 FTIR Peak Height Oxidation  
Unit of Measure: absorbance / cm

Reference Oil	Mean	Standard Deviation
823	127.4	11.1

Percent Increase in Viscosity at 40°C from 300 to 360 hour  
Unit of Measure: SQRT( %)

Reference Oil	Mean	Standard Deviation
823	8.610	0.929

- Current Results on Reference Oil 823-1:

FTIR	KV40 (SQRT)
124.3	63.8 (7.987)
104.9	47.1 (6.863)
103.3	48.5 (6.964)
102.6	41.1 (6.411)
95.2	45.4 (6.738)

# Volvo T-13 Reference Oil Request

- NCDT is looking at moving the limits for the Volvo T-13 for PC-12
- Current Limits for API CK-4
  - FTIR Peak Height Oxidation  $\leq 125$
  - Percent Increase in KV40 (300-360 hrs)  $\leq 75$  (SQRT %  $\leq 8.66$ )
- PC-12 Limit Proposal
  - FTIR Peak Height Oxidation  $\leq 80$
  - Percent Increase in KV40 (300-360 hrs)  $\leq 50$  (SQRT %  $\leq 7.07$ )
- **A question was asked during the June NCDT meeting:**
  - **Does this panel believe that a new reference oil, with performance similar to the PC-12 proposed limits, should be used for this test?**

# Current T-13 Reference Oils (823/823-1)

- An industry Zi alarm was just obtained at Lab G on a test run with TMC 823-1 with C batch Liners. This alarm was on both FTIR and KV40 parameters.
- I would ask the Statisticians to come back with a recommendation by the next meeting for what to do about the current mild status of the test.

# Mack T-12 Coordinated Reference

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- Lab A – Test Completed
- Lab D – Test Completed
- Lab G – Test Completed

Lab G	DPB	CLW	TRWL	OC	PB2
Final Result (Transformed Value) <i>[Using Current ICF]</i>	21 (3.0445)	16.6	50	61.6 (4.1207)	9 (2.1972)
Target (Std Dev)	3.1060 (0.2420)	Stand 16.2 / Lab 15.1 (3.7 / 2.8)	62.0 (28.2)	4.0930 (0.0790)	2.1250 (0.3330)

**When will data be available on LTMS?**