

Mack / Volvo Surveillance Panel Meeting

May 23, 2023

David Brass (chair)

Agenda

- Operational Review of Volvo T-13 TMC 823-1 Runs
- Statistical Review of TMC 823-1 Runs
- Mack T-12 Parts
 - Coordinated Referencing of YYYYFZQWB
 - Oil Consumption Measurement of Batch F Piston Crowns
- Mack T-8/T-11 Parts
- Volvo T-13 Severity Adjustments
- AOB

Operational Review of Volvo T-13 TMC 823-1 Runs

- External Presentation

Statistical Review of TMC 823-1 Runs

- External Presentation
- Passing motion from May 23, 2023:
 - Adopt TMC 823 targets for TMC 823-1 and set calibration status as of today, May 23, 2023 for stands used in the coordinated reference if they meet the calibration requirements.

Volvo T-13 Reference Status

Stand status based on LTMS:

	Lab A	Lab B	Lab D	Lab G
TMC 823-1 Testing	Stand 4	Stand 3	Stand 2	Stand 1
Referenced	Stand 6 (expires 8/5/23) Stand 2 (expires 3/14/24)		Stand 1 (expires 1/1/24)	Stand 3 (expires 8/16/23)
Not Referenced		Stand 1 (expired 9/4/22)		Stand 2 (expired 5/3/23)

- Should all future references be run on 823-1 to help generate more data to understand the target value?

Passing motion from May 23, 2023:

- **Future references for the Volvo T-13 will be run on TMC 823-1 until 10 data points have been generated on this reference oil. Once 10 reference tests are completed references can be conducted on TMC 823 or TMC 823-1.**

Mack T-12 Parts and Referencing Needs

Mack T-12 Hardware

Current Parts Batches

	Mack T-12
Top Ring	X
2 nd Ring	X (limiting part)
Oil Ring	X
Piston Crown	FsubE
Rod Bearing	Y
Main Bearing	P
Liner	W
Skirt	B
Kits left at TEI As of May 9	2

Future Parts Batches

	Mack T-12	Approximate Kits Available	(limiting part)
Top Ring	Y	353	
2 nd Ring	Y	329	
Oil Ring	Y	329	
Piston Crown	F (sub ?) Excluding subA	315 267 (w/o subA)	
Rod Bearing	Z	326	
Main Bearing	Q	450	
Liner	W	339	
Skirt	B	327	

- Mack T-12 current parts batch is almost out at TEI (What is the supply at the labs?)
- Mack T-11 has already started to pull YYYYFsubEZQWB parts for testing.
 - Oil consumption on this combination has looked good so far.

Mack T-12 Reference Status

Stand status based on LTMS:

	Lab A	Lab D	Lab G
Referenced	Stand 4 (expires 7/2/23)	Stand 1 (expires 7/4/23)	
Not Referenced			Stand 4 (expired on starts)

Passing motion from Oct. 6, 2022:

- The next references for T-12 will be done on the new batch of parts at all active labs. Timeframe of completion is to be determined at a later date. The batch of parts to be used for these tests will include top ring Y, 2nd ring Y, oil ring Y, piston crown F (subgroup TBD but will exclude subgroup A), connecting rod bearing Z, main bearing Q, liner W, and piston skirt B.

Passing motion from May 23, 2023:

- The next references for T-12 will be done on the new batch of parts at all active labs. Coordinated Reference Tests should start by July 5, 2023. The batch of parts to be used for these tests will include top ring Y, 2nd ring Y, oil ring Y, piston crown F (randomized subgroups but will exclude subgroup A), connecting rod bearing Z, main bearing Q, liner W, and piston skirt B.

Mack T-12 Hardware – Piston Crowns

Oil Consumption with
6 piston crowns from same subgroup

Piston Serial Number	Total Quantity Pistons (Kits)	X Rings	Y Rings	Quality
S-4940#YYY	432 (72)		10.7 g/hr (T-12*)	Good
S-4941#YYYA	291 (48)	40 – 70 g/hr (T-11 and T-12)	45.9 g/hr (T-12*)	Bad
S-4942#YYYB	184 (31)	25 g/hr (T-11)		Good
S-4943#YYYC	358 (59)	34 g/hr (T-12)	15.4 g/hr (T-12*)	Good
S-4944#YYD	285 (47)			
S-4945#YYE	324 (54)	15-20 g/hr (T-12)	12.6g/hr (T-12*), 26 g/hr (T-11)	Good
S-4945#YYYH	19 (3)			
TOTAL	1893 (315)			
TOTAL w/o subA	1602 (267)			

- Before conducting coordinated referencing, we need to determine which piston crowns should be used.

Prior T-12 Piston Crown Testing

Tested with X Rings, W Liner

Testing on Bulldog 15W-40 in T-12 Phase 1 conditions

Oil Consumption	Cylinder 1 Piston Crown Subgroup	Cylinder 2 Piston Crown Subgroup	Cylinder 3 Piston Crown Subgroup	Cylinder 4 Piston Crown Subgroup	Cylinder 5 Piston Crown Subgroup	Cylinder 6 Piston Crown Subgroup
15.2	Blank	D	E	E	E	E
19.5	Blank	D	E	E	E	E
19.3	A	D	E	E	E	E
23.7	A	A	E	E	E	E
34.07	A	A	A	E	E	E
39.94	A	A	A	A	E	E
55.6	A	A	A	A	A	E
19.2	E	E	E	E	E	E

Engines containing at least 4 subgroup E piston crowns produced favorable phase 1 oil consumptions

Mack T-12 Hardware – Piston Crowns

Oil Consumption with
6 piston crowns from same subgroup

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S-4940#YYY	432 (72)		10.7 g/hr (T-12*)	Good
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S-4943#YYYC	358 (59)	34 g/hr (T-12)	15.4 g/hr (T-12*)	Good
S-4944#YYVD	285 (47)			
S-4945#YYVE	324 (54)	15-20 g/hr (T-12)	12.6g/hr (T-12*), 26 g/hr (T-11)	Good
S-4945#YYYH	19 (3)			
TOTAL	1893 (315)			
TOTAL w/o subA	1602 (267)			

- Before conducting coordinated referencing, we need to determine which piston crowns should be used.
- Should Subgroup A be thrown out? **OR**
- Should kits be built with randomized pistons, but 1 piston must be from Subgroup A to conserve parts?

Prior testing suggested that a single piston using Subgroup A would not affect the oil consumption

This would allow for 291 kits to be build with 1 Subgroup A and 5 other pistons. When Subgroup A is exhausted there will remain 24 kits that can be built with the remaining piston crowns. This would allow the short fall on the piston crowns to not be as substantial (48 more kits can be made).

Mack T-11 Hardware

- Mack T-11 has already moved to the YYYYFsubEZQWB parts combination.
- Lab G ran a test and generated an oil consumption of 26.0 g/hr and the parts were approved by email ballot.
- Should only Subgroup E piston crowns continue to be used for Mack T-11 until the piston crowns are sorted? Should we follow the same decision as for the Mack T-12 kits so that these would become one kit group from now on?
- Prior Passed Motion:

If Mack T-11 parts WWWEYPWB run out before Mack T-12 coordinated references begin, recommend using new batch YYYYFZQWB where batch F subgroup E piston crowns are used until we can confirm oil consumption performance of the other piston crown subgroups. **This new batch of parts should be referenced by each lab introducing it**, followed by a meeting of the SP to confirm performance of the parts. TMC shall adjust the reference periods to have no net gain or loss of reference period time.

Passing Motion from May 23, 2023

Until Mack T-12 coordinated references has been completed and parts accepted, new batch YYYYFZQWB where batch F piston crowns (randomized subgroup excluding subgroup A) are used. **This new batch of parts should be referenced by each lab introducing it**, followed by a meeting of the SP to confirm performance of the parts. TMC shall adjust the reference periods to have no net gain or loss of reference period time.

Mack T-8 Hardware

- As the W 2nd rings are no longer available the Mack T-8 is being shifted to the Y top ring, Y 2nd ring, Y oil ring for all tests going forward.

Volvo T-13 Severity Adjustments

- External Presentation