

Mack / Volvo Surveillance Panel Meeting

May 22, 2024

David Brass (chair)

Agenda

- Reference Oil 823-1 Volvo T-13 Testing
- New Reference Oil Matrix
- Volvo T-13 Bearings
- AOB

RO 823-1 Targeted OC Understanding

Pistons	Rings	OC (48-96 hr)	Test Site
New (0423)	New (1017729)	44.4	Lab D
New (0123)	New (1017729)	44.4	Lab G
Old (2019)	New (1017729)	30.8 (through 84 hours)	Lab B
New (0123)	Old (903045 – 934730)	26.9	Lab G
Old (2021)	Old (< 808k)	23.1	Lab B

Both new rings and pistons appear to be affecting Oil Consumption. When used in combination oil consumption is very high. If either the pistons or rings are swapped out for older ones the oil consumption is reduced.

Oil Consumption appears to be affected by the rings

- Test Lab G ran testing to understand the effect of the rings

	Reference Test	Run 1	Run 2	Run 3
Pistons	Kit 866	Kit 939	Kit 939	Kit 939
Rings	Kit 866	Kit 939	Kit 866	Kit 939
Liners	Kit 866	Kit 939	Kit 939	Kit 939
Oil Consumption (48-96 hr, g/hr)	29.4	44.4	26.9	36.2
Oil Consumption (48-192 hrs, g/hr)	25.3			

- Fresh 832-1 oil was added for each test. Engine was run through initial break-in cycle before each run.

Kit	866	939
Piston Date Codes	0822	0123
Top Ring Stamp	903k – 934k	1017k
2 nd Ring Stamp	897k – 934k	998k – 1020k
Oil Ring Stamp	900k – 945k	950k – 974k

Oil Consumption appears to be affected by the pistons

CMIR	Stand	Oil Consumption (48-192 hr)	Oil Consumption (48-96 hr)	Kit #	Piston Date 1	Piston Date 2	Piston Date 3	Piston Date 4	Piston Date 5	Piston Date 6
172877*	A2	19.9	18.1	853	0522 1218	0522 1328	0522 1324	0522 1330	0522 1224	0522 1335
179973	A2	21.0	21.6	917	0822 2311	0922 1307	0822 2306	0822 2309	0821 1500	0722 0623
177777	B3	22.9	23.1	795	0421 1644	0421 0819	0521 0015	0521 0016	0521 2355	0521 2354
	G2		26.9	939/866	0123 1218	0123 1304	0123 1305	0123 1322	0123 1302	0123 1302
177774	G1	25.3	29.4	866	0822 1829	0822 1814	0822 0316	0822 0043	0822 1859	0822 1814
177776	A4	28.8	31	860	0522 1331	0522 1338	0522 1337	0522 1337	0522 1339	0522 1330
180631	G2	28.9	34.3	907	0822 0013	0922 0509	0922 0501	0922 0837	0922 1117	0922 1307
187293	G3	32.0	35.2	954	0922 2054	0922 2209	0922 2054	0922 2006	0922 2155	0122 0105
177775	D2	32.9	37.5	856	0522 1331	0522 1341	0522 1341	0522 1321	0522 1307	0522 1325
185298	D1	33.3	38.9	929	0223 0635	0223 0637	1022 0413	1022 0432	1222 1008	1022 0411
179972	A8	31.2	40.1	887	0922 0844	0922 0921	0922 2212	0922 0841	0922 0822	0922 2228
	G2		44.4 36.2 repeat	939	0123 1218	0123 1304	0123 1305	0123 1322	0123 1302	0123 1302
186388	D2	38.3	44.4	960	0423	0423	0423	0423	0423	0423

0922 and later

- Pistons after a certain date appear to be affecting Oil Consumption

*RO823

■ < 30
 ■ 30 ≤ x < 35
 ■ 35 ≤ x

Parts Combinations

CMIR	Stand	Oil Consumption (48-192 hr)	Oil Consumption (48-96 hr)	Kit #	Liner Batch	Piston Date 1	Top Ring Stamping
172877*	A2	19.9	18.1	853	C	0522	5x 681k-808k, 1x 934k
179973	A2	21.0	21.6	917	D	0821, 0722, 3x 0822, 0922	1x 903k, 5x 939k
177777	B3	22.9	23.1	795	C	2x 0421, 4x 0521	
	G22		26.9	939/866	D	0123	1x 903k, 1x 914k, 4x 934k
177774	G1	25.3	29.4	866	C	0822	1x 903k, 1x 914k, 4x 934k
177776	A4	28.8	31	860	C	0522	3x 903k, 3x 934k
180631	G2	28.9	34.3	907	C	0822, 5x 0922	
187293	G3	32.0	35.2	954	D	5x 0922, 0122	6x 1017k
177775	D2	32.9	37.5	856	D	0522	4x 914k, 2x 925k
185298	D1	33.3	38.9	929	D	3x 1022, 1x 1222, 2x 0223	6x 1000k
179972	A8	31.2	40.1	887	D	0922	5x 939k, 1x 968k
	G2		44.4 36.2 repeat	939	D	0123	6x 1017k
186388	D2	38.3	44.4	960	D	0423	6x 1017k

*RO823

■ < 30
 ■ 30 ≤ x < 35
 ■ 35 ≤ x

■ 0922 and later

■ >934k

Piston Coloration Difference

It appears that there is a difference in the color of the coatings on the pistons that are being received



Volvo comments on the coloration:

“in general the Manganese Phosphate (MnP) is dark grey/black in colour. Depending on the age of the chemical baths and the quality of the rinsing water the colour of the as forged surfaces (where the MnP is not as uniform and can retain chemicals) can be white, yellow or even green in colour. It does not have an impact of the function of the piston,”

Julian Codes and Part numbers

All pistons produced before 2022
pistons have Julian Date Codes
dddyy stamped above the M.



249th Day = Sept 6

Sept 2022

All pistons produced in 2023 have a
Pww stamped above the M.



Week 14 = Apr 3-9

Apr 2023

Liners

Liner parts number was updated to 21334768 from 20852790 a number of years ago.

We have been using this part number for a while and should update this on the TMC website.

823-1 Results – Sorted by Oil Consumption

CMIR	Stand	FTIR Peak Height	Delta KV40 (300-360)	Oil Consumption (48-192)	Oil Consumption (48-96)
179973	A2	115.9	64.2	21	21.6
177777	B3	124.3	78.2	22.9	23.1
177774	G1	103.3	61.2	25.3	29.4
177776	A4	102.6	52.8	28.8	31
180631	G2	95.2	57.7	28.9	34.3
187293	G3	117.5	71.0	32.0	35.2
177775	D2	104.9	59.6	32.9	37.5
185298	D1	121.6	68.8	33.3	38.9
179972	A8	113	63.5	31.2	40.1
186388	D2	131.1	93.9	38.3	44.4
Target		109.3	$(8.139)^2 = 66.2$		

- We have now obtained 10 test results in the Volvo T-13 using TMC 823-1. Upon completion of the test from Lab B we should evaluate if the current targets are suitable

TEI Parts

- The following parts are in hand at TEI (approximate)

Pistons	Quantity	Rings	Quantity
0119	0	500k – 600k	10
0619	0	962163	7
0819	2	968391	3
1120	1	975092	3
0722	6	1017728	1
0922	14	1017729	40
1022	3	1040918	13
1122	2	1046895	20
0223	37	1046896	14
0423	51		

- Liner Batch D. Only 1 Batch C liner kit remains.

Volvo T-13 Reference Oil Matrix Testing

Lab A / Stand 1	Lab B / Stand 1	Lab D / Stand 1	Lab G / Stand 1
New Reference Oil	New Reference Oil	New Reference Oil	New Reference Oil
New Reference Oil	New Reference Oil	New Reference Oil	New Reference Oil

Both tests must be conducted in the same stand and run consecutively (no candidates in between)

Current Reference Status

Lab	Stand	Date Reference Expires
A	2	1/16/25
A	4	3/23/24
A	8	6/17/24
B	3	Testing now
D	1	1/3/25
D	2	3/4/25
G	1	3/23/24
G	2	5/22/24
G	3	3/2/25

Volvo T-13 Rod Bearings

1. TEI has been informed that bearings from sets 21610676 and 24049962 are no longer available from dealer. 7 sets remain at TEI.
2. Only bearings from set 23994963 (red color upper bearing) are available.
3. Has there been any testing conducted with these red color bearings?

