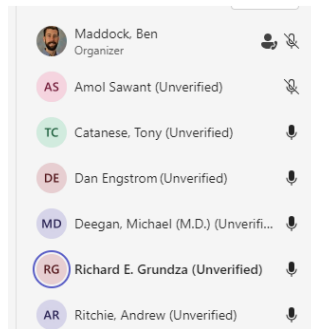


**Sequence VH O&H Meeting**  
**April 30<sup>th</sup>, 2024 at 3PM EST via MS Teams**

**Attendees:**



**Overview:**

1. Organized Build Workshop Actions
2. Fuel
3. Hardware
4. Operation

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**Notes:**

**1. Build Workshop Actions**

**Procedural actions:**

- 7.5.6.1, Step 4 for Automated Parts Washer and Ultrasonic set of instructions
  - o Blockage of coolant passages is left to the discretion of the laboratory.
- 7.6.2 Clarify that insulation from intake manifold should be removed
  - o Also allow for modification to butterfly to be plugged for idle control
- 7.6.10 Add TEI as a supplier for oil separators to A12.6
  - o *A12.6 Oil Separator:*  
F47E- 6A785-AA Oil Separator  
Supplier TBD
- 7.7.6.1 Allow for front covers to be cleaned in the ultrasonic cleaner. Remove the last sentence.
- 7.7.4 Add suggestion to use RYDLYME heat exchanger and dyno cleaner
  - o <https://www.apexengineeringproducts.com/product/rydlyme-biodegradable-descaler/>
- 7.8.2 Require an anaerobic sealant with Loctite found to be suitable (Red 518)
- 7.8.4.1, Step 3: Correct the hone order to 2, 4, 1, and 3
- 7.8.4.1, Step 5: Change Ra units from  $\mu\text{m}$  to  $\mu\text{in}$
- 7.8.4.1, Step 5: Require that torque plates remain in place when measuring surface
- 7.8.5.2, Step 2. Allow for file grinder to dress piston rings
  - o *“(2) After the rings are cut remove the ring from the cutting tool, deburr and wipe with a dry towel. A Sunnen soft stone<sup>22,13</sup> or needle file have been found suitable.”*

**Actions that need further discussion:**

- 7.8.5.1: Ring grinder bit part number SA-81 CYL S/C
- 7.8.4.1, Step 5: Defines brushes

- C30-PHT-731 brush part number
- 7.8.4.1 The group to standardize on identical surface analyzer
  - Suggested Mitutoyo SJ-410 (IIIH)
  - Define stylus and probe diameter
  - Define analyzer settings and filters
  - Two measurements middle and top
- Investigate load calibration options with Sunnen machines
- Fuel temperature control
  - Labs to investigate on what's typical and where to land
  - Identify Fuel Rail temp location
  - Add to op data study to help guide
- Verify fuel injector prep requirement
  - Hot pink (latest superseded #) are regarded as lower quality
- Blowby tree cleaning was questioned but not fully explored
  - Hose replacement frequency?
- RAC system VFD option was proposed
- Bore gauge tip diameter definition
  - Poll the labs to identify commonality that may already exist
- Coordinated reference
  - Labs are receptive but timing and logistics could be challenging
  - Pat Lang suggested that a number of engines are built at one lab and then shipped to the others for testing.

**Notes:**

- Connecting rod notch orientation was discussed
  - Most labs building engines with piston notch facing forward and connecting rod notch facing backwards per build manual
  - Lab B building with both notches (piston and con rod) facing the front
  - Ford clarified that piston notch must face forward but the con rod can be oriented either direction per Ford drawings
- JHU623 stones have been acknowledged but not investigated further
  - Only Afton is short on honing stones and will work with other labs to trade

Lab	How often are brushes changed?	Load	Stokes	Typical Ra (µin)	Piston to Bore (mm)	Top Ring (in)	Bottom Ring (in)	Typical Break-in Blowby (LPM)	Deburr Tool	Notes
Procedure	Undefined	25 to 30	45	8 to 13	0.020 to 0.046	Undefined	Larger than TR	Undefined	Soft stone	
A	?	20 to 25	45	10 to 12	0.025	0.034	0.036	70 to 72	Needle file	Use piston chamfer to drive ring gap size
B	?	30	25	9 to 10	0.040 to 0.046	0.032	0.034	?	Soft stone	
D	With honing fluid, every 15h	28	45	10 to 12	0.030	0.027	0.029	65 to 67	Soft stone	Same ring gap all sizes
E	Never	20 to 25	30	11 to 13	0.038 to 0.045	0.029	0.031	70 to 72	Needle file	Ring gaps vary by size
G	Never	20	10	9 to 10	0.030 to 0.038	0.026	0.028	?	Soft stone	Use piston chamfer to drive ring gap size

- Taper and OOR are non-issues and comparable across labs
- Gaps vary with two groups of similar values
  - A & B closer to mid 30s
  - Rest in mid 20s
- Piston to bore clearance varies widely
- Ra values are on the lower end but also vary
- Strokes/Load to get to the same Ra value vary widely
- 7.6.3.2: Some labs noted they wet polish with Green Scotch Brite Pad #96 instead of dry polish

- No action required
- Front cover part # F6AE6D080BC
  - Verify with Afton new cover
  - 96-97 Thunderbird

Lab	Fuel Injector Batch	Comment
Procedure	Undefined	-
A	Purple/Brown	
B	Purple/Brown/Pink	
D	Purple	Have brown but just haven't introduced yet.
E	Purple/Brown	Primarily brown.
G	Purple/Brown	

- PCV rejection rate
  - Labs observing high rejection rate on pretest screening (~50%)
- Lab A applies 30 inHg of pressure for 10 minutes to the engine coolant circuit to check for leaks
- Observed Lab B's practice of installing two rear main seals to prevent oil leaks during test
- Feedback: Adding more time for stand visits might have been helpful. Group may target stand visits pending op data study

## 2. Fuel

- Julie suggests 7525 might not be suitable for use

Hi Ben,  
 I looked into the D7525 (RSSOT) oxidation test suggested at the meeting last week. This was developed for middle distillate fuels (diesel) not for gasoline. D525 (used currently) is for gasoline fuels.

I wouldn't use the D7525 for gasoline. They both use pressured oxygen and look for the breakpoint (induction time) but D7525 is at a higher temperature (140C vs. 100C). I'm not sure it's safe to run D7525 with gasoline and it's probably too hot to get meaningful data.

Julie

- SwRI tested samples in D7525, official analysis hasn't been reported but indications that it provides little value
- Mike: "Tier 3 fuels are considering to extend the time limit on D525 due to accommodate concerns with hybrids"
- Afton receiving samples from Haltermann before and after AO was replenished to the fuel batch. Afton also testing a sample from the recent shipment of the latest fuel batch and will track AO depletion over time
  - Ben will report out values as soon as they're available
- Afton will also work to formalize a procedure for all analytical labs to use so that they're empowered to perform the same analysis

## 3. Hardware

- FCS Order through TEI
  - Mike believes piston supplier may have "leftovers" on-hand, 200 of each, per size?
  - SwRI provided order quantity for piston / rings
  - Valvoline needs to identify piston / ring inventory requirements
- Ford consumables to be addressed next
- Camshafts

- Afton traded with Intertek to close a gap in their inventory
- Mike: “Apparently all the cams were provided by Essex engine plant which is no longer producing them. I am now in process of trying to find out what supplier was providing the rough cams (castings) to see if there is then a possibility of getting them finished via IMTS or other supplier.”
- “There are some cams with the correct part numbers on line but only seem to have the RH cam, 1L2Z-6250-AA. The LH cam, 1L2Z-6250-DA, is not available.”

**4. Operation**

- TMC Honing Data from PM
  - Pending additional data from labs
  
- Operational Data Study: N-10-1 approval matrix vs PM
  - Proposed timing: Labs to provide data in the correct format for analysis by 6/21/2024

TESTKEY	LTMSLAB	IND	Op Data?
166515-VH	A	931	
169622-VH	G	1011-1	
172588-VH	G	931	
172259-VH	D	1011-1	
172583-VH	A	1011-1	
172589-VH	G	931	
172587-VH	G	940	
172582-VH	A	940	
172584-VH	A	1011-1	
166686-VH	D	931	
171799-VH	D	931	
172585-VH	A	1011-1	
175648-VH	A	931	
175637-VH	G	1011-1	
175640-VH	G	931	
169623-VH	G	1011-1	
175643-VH	G	940	

VGO PRICE LIST  
4.6L ENGINE  
March 12, 2024



Ford Component Sales, LLC

Current Ford Service Part Number	Current Ford Engineering Part Number	Description	Price	Minimum Order Quantity	Order Multiple	Lead Time (Business Days)	Lead Time (Calendar Days)	Ship Location	Country of Origin	Total Parts across the labs	Lubrizol - Parts to Order	Lubrizol - Unit Cost	Intertek - Parts to Order	Intertek - Unit Cost	SWRI - Parts to Order	SWRI - Unit Cost	Alton - Parts to Order	Alton - Unit Cost	Ashland - Parts to Order	Ashland - Unit Cost
	3U1E-6148-AB	PISTON RING SET - 0.125 mm	\$ 63.78	12	12	27	38	ADRIAN MI	MX	1162	150	\$ 9,567.00	800	\$ 51,024.00	100	\$ 6,378.00	112	\$ 7,143.36		\$ -
	YU1L-6148-BA	PISTON RING Set - 0.250 mm	\$ 63.78	12	12	27	38	ADRIAN MI	MX	1137	150	\$ 9,567.00	800	\$ 51,024.00	75	\$ 4,783.50	112	\$ 7,143.36		\$ -
	3U1E-6148-BB	PISTON RING SET - 0.375 mm	\$ 63.78	12	12	27	38	ADRIAN MI	MX	1137	150	\$ 9,567.00	800	\$ 51,024.00	75	\$ 4,783.50	112	\$ 7,143.36		\$ -
	YU1L-6148-CA	PISTON RING SET - 0.500 mm	\$ 63.78	12	12	27	38	ADRIAN MI	MX	1041	150	\$ 9,567.00	800	\$ 51,024.00	75	\$ 4,783.50	16	\$ 1,020.48		\$ -
YU1L610AB	YU1L610AB	PISTON, 0.125 mm	\$ 58.45	12	12	27	38	ADRIAN MI	MX	1392		\$ -	720	\$ 42,084.00	640	\$ 37,408.00	32	\$ 1,870.40		\$ -
YU1L610BB	YU1L610BB	PISTON, 0.25 mm	\$ 58.45	12	12	27	38	ADRIAN MI	MX	1400		\$ -	720	\$ 42,084.00	640	\$ 37,408.00	40	\$ 2,338.00		\$ -
YU1L610BC	YU1L610BC	PISTON, 0.375 mm	\$ 58.45	12	12	27	38	ADRIAN MI	MX	1400		\$ -	720	\$ 42,084.00	640	\$ 37,408.00	40	\$ 2,338.00		\$ -
YU1L610CC	YU1L610CC	PISTON, 0.50 mm	\$ 58.45	12	12	27	38	ADRIAN MI	MX	1400		\$ -	720	\$ 42,084.00	640	\$ 37,408.00	40	\$ 2,338.00		\$ -
SL3E600A	SL3E621AB	PUMP ASY - OIL		24	24	27	38								350		12	\$ -		\$ -
1L2E6250AA	1L2E6250DA	CAMSHAFT													40					\$ -
1L2E6250DA	1L2E6A27ACA	CAMSHAFT													40					\$ -

Other Conditions: Product sold by FCS will be "as is" with no warranty liability except as specified by FCS. MOQ's and Lead Time is TBD. Terms for this sale will be Cash in Advance (CIA) and FOB plant/supplier. Please forward all purchase orders to: fcsorders.com with copies to: wjku1@ford.com, fcsorder@ford.com

Total: \$ 38,268.00 Total: \$ 372,432.00 Total: \$ 170,360.50 Total: \$ 31,334.96 Total: \$ -

Sealed Performance H858CP H858CP 1.00MM Standard bore

Current Ford Service Part Number	Current Ford Engineering Part Number	Description	Price	Minimum Order Quantity	Order Multiple	Lead Time (Business Days)	Lead Time (Calendar Days)	Ship Location	Country of Origin	Total Parts across the labs	Lubrizol - Parts to Order	Lubrizol - Unit Cost	Intertek - Parts to Order	Intertek - Unit Cost	SWRI - Parts to Order	SWRI - Unit Cost	Alton - Parts to Order	Alton - Unit Cost	Ashland - Parts to Order	Ashland - Unit Cost
		Bare Block								30	\$ -		\$ -		0	\$ -	30	\$ -		\$ -

\* Supporting hardware will be added to this list at a later date

