

Sequence X Severity Task Force

Meeting Minutes

01/25/22

Attendance 01/25/22

- Michael Deegan
- Rich Grundza
- Christian Porter
- Christine Eickstead
- Amol Savant
- George Szappanos
- Jason Soto
- Alfonso Lopez
- Travis Kostan
- Pat Lang
- Charlie Leverette

Agenda 01/25/22

- Review lab video/photographs
- Action item to measure pipping between the heat exchanger and separator
- Mike presentation of PCV details per Ford engineering as they apply to our set up
- Action item for labs to present flow data in the excess branch of the blowby tree that goes to the air charge
- Turbo discussion, were we running some boost before and diverting all flow to the air charge branch. Please study drawing and look at previous CAN data

Lubrizol Stand Review

- Photographs of LZ were presented. (See slides below)
 - LZ photo of the blow by stack shows the 45 degree elbows and total length. LZ and Valvoline have this configuration. There was discussion of increased baffling and drain back with the 45 degree elbows. The concern of thermocouple positioning and condensation effects were discussed. With the intent to communize all stands an action item was made for George to change his stack plumbing and install a “y” pipe fitting to eliminate the fittings. This y fitting should eliminate the condensation issue. If successful, all labs to adopt. George will install on his next reference.
 - The LZ coolant flow in the heat exchanger is in parallel flow.

Valvoline Stand Review

- Photographs of the Valvoline stand were presented (See slides below)
 - This configuration uses the 45 degree elbows and similar in length to the oil separator to the LZ stand
 - The biggest difference seen in these pics is the length of tubing from the oil separator to the PCV valve. There are no length limits or descriptions in the procedure. No discussion was made to communicate this portion of the blowby stack. There are stand configuration constraints at Valvoline that forced them to assemble the stack in this configuration.
 - Coolant through the BB heat exchanger is in counterflow direction.

SWRI Stand Review

- A drawing and photographs of the SWRI stand were presented (see slides below).
- The configuration is similar to Intertek.
- Coolant flow in the BB heat exchanger is in counterflow configuration.

Stand review summary

- The BB stand plumbing between the heat exchanger and the oil separator between labs needs to be standardized. Action item for George to install the y pipe and collect data on his next reference.
- The BB stack plumbing after the oil separator is not specified in the procedure. There are lab differences that need to be addressed.
- Afton yet to present stand photos

Blowby Gas Flow / Hardware Discussion

- A concern was raised that during second stage there may be some amount of boost pressure that closes the PCV valve. At that point, all blowby gas flow would flow through the leg of the system going to the air tube downstream of the air filter box. See crankcase ventilation schematic below.
- An action item was made to study and compare the boost pressure from CAN data of the precision matrix to current tests.
- The flow distribution between the two legs of the crankcase ventilation system was never studied or measured during test development. Knowing the max flow rate of the PCV valve and the limits of manifold pressure to close the valve, we are now realizing that the flow characteristics may be different across labs and stands.

Blowby Gas Flow / Hardware Discussion

- Travis presented plots of the manifold pressure by lab and Lab G had the highest pressures on all tests studied – severe vs mild
- An action item was made to compile and plot the boost data from the precision matrix and compare to current tests.
- Labs to measure the flow rates of the BB gas in the air tube branch and PCV branch. Measure in both stages. Vary the load in stage two and observe if the PCV valve is closing.
- Christian Porter questioned the chain batch and asked if there have been any changes. Jason has inspected chains from previous tests and across different batches and can not correlate to the severity shift.
- Next meeting - February 8

Photo Review LZ

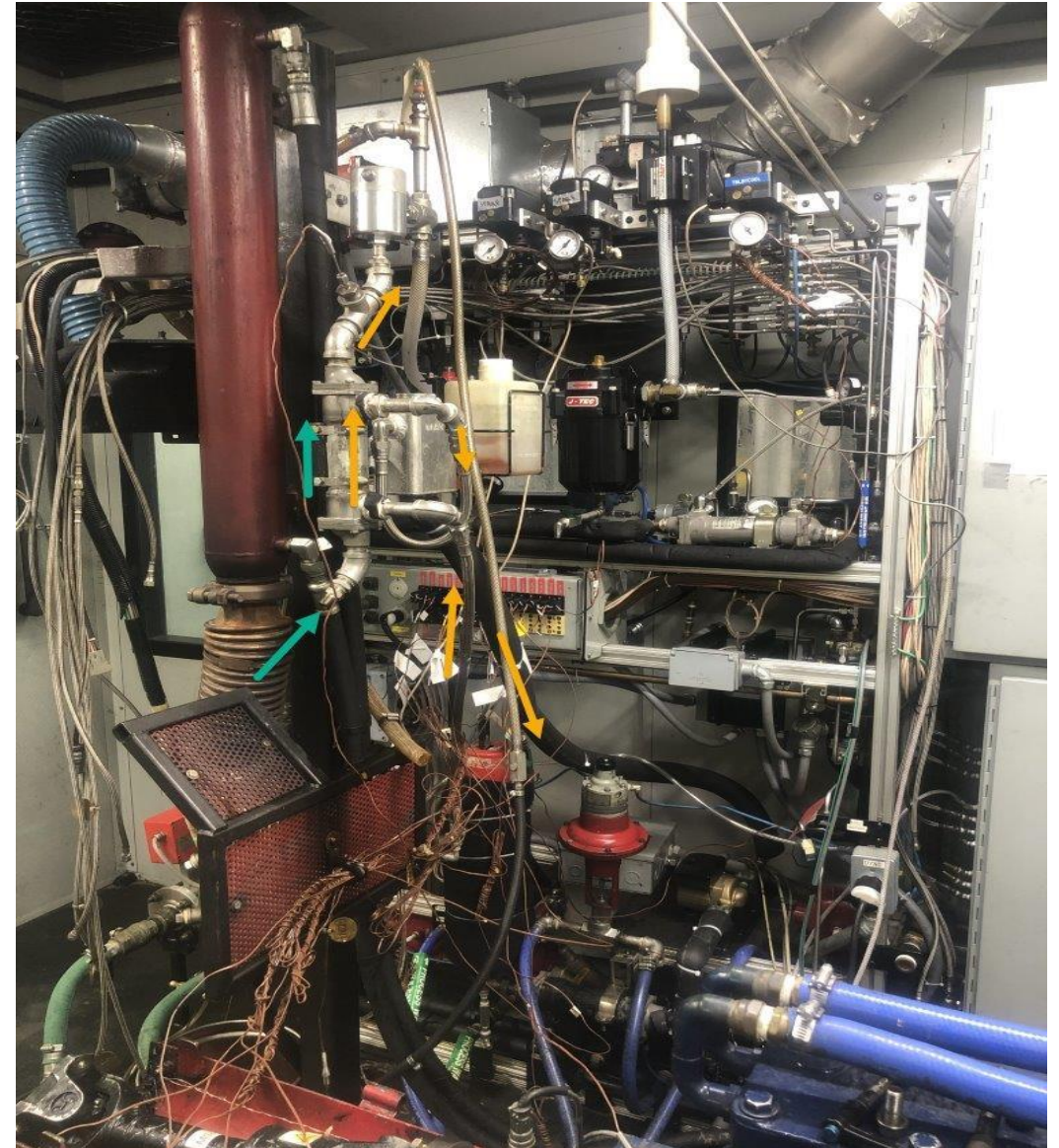
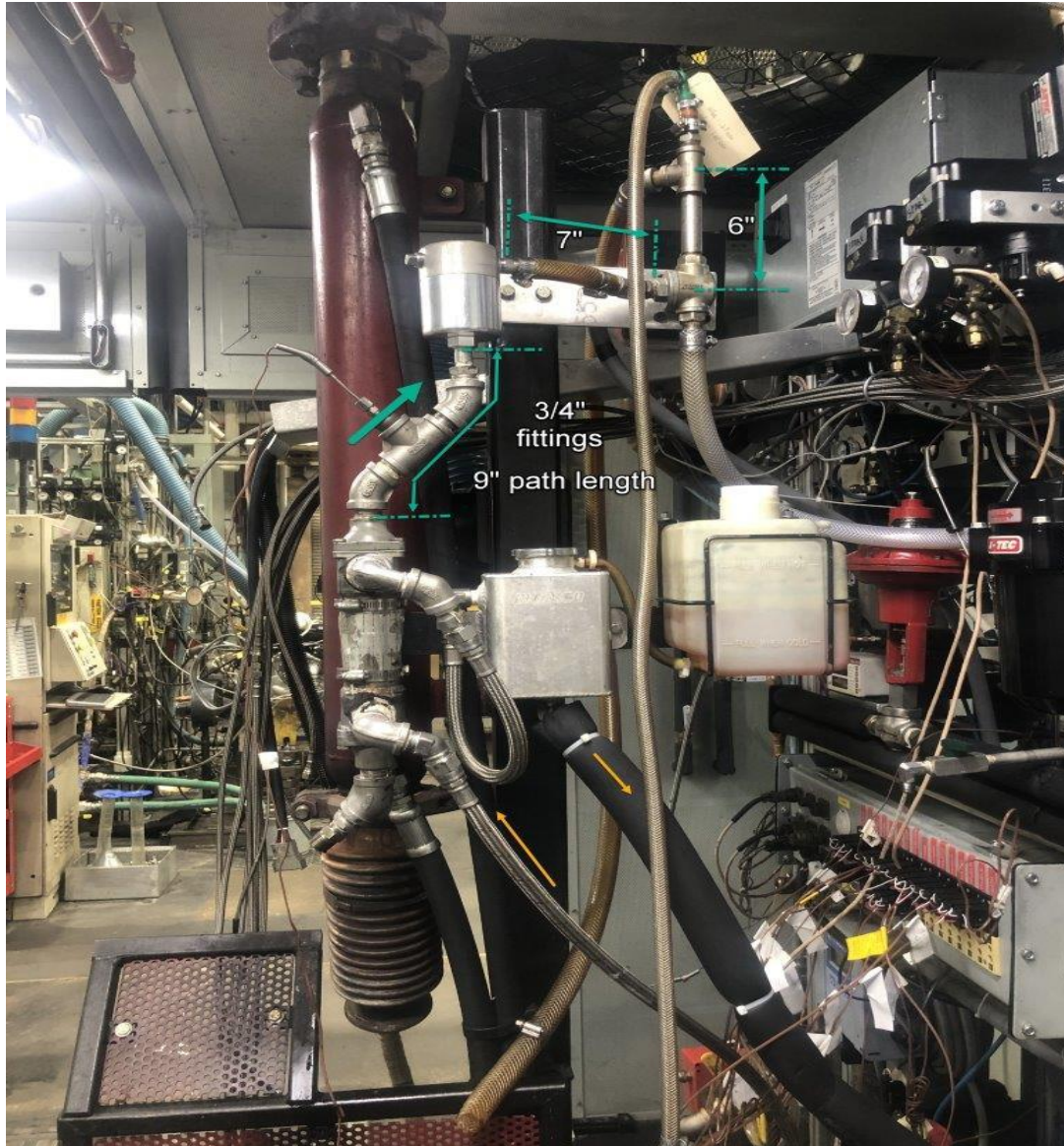


Photo Review LZ

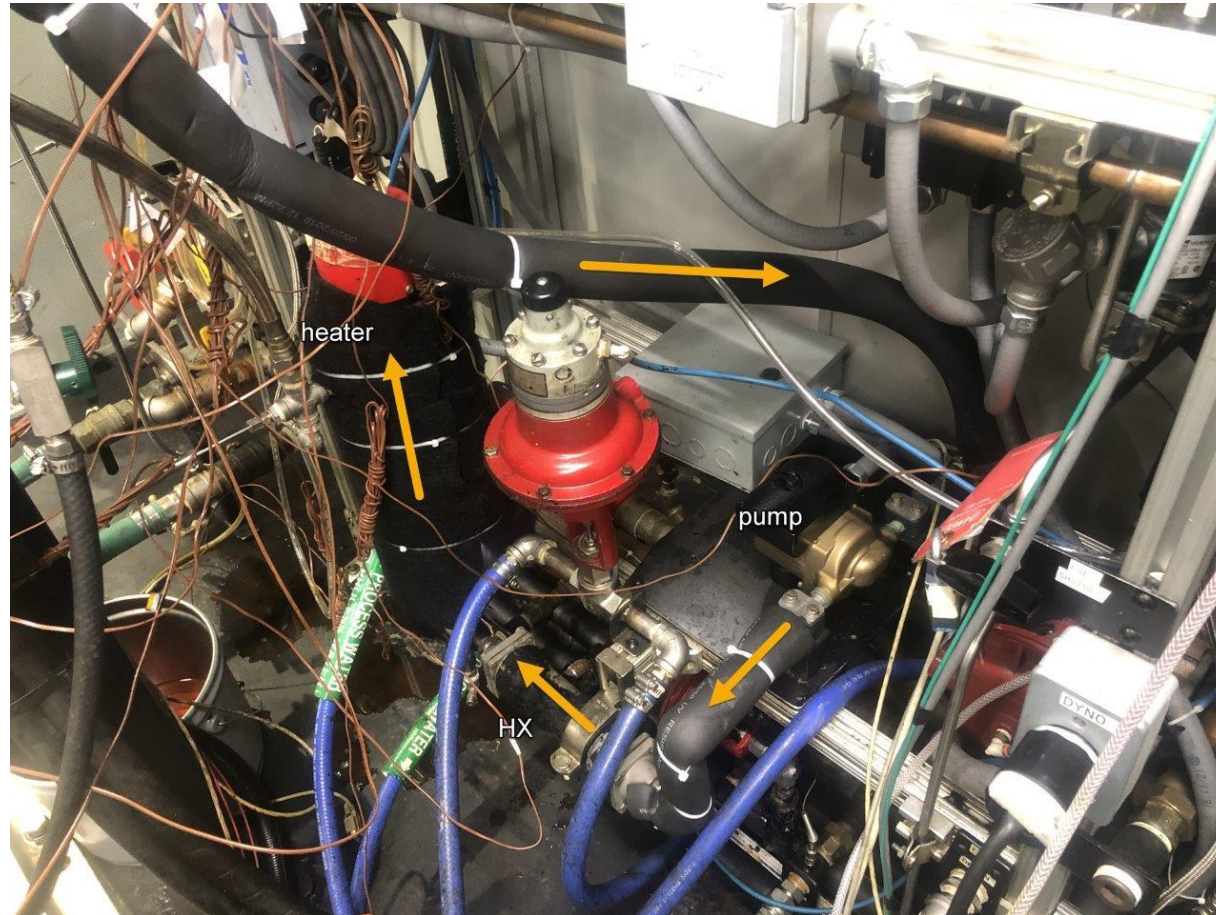


Photo Review - Valvoline

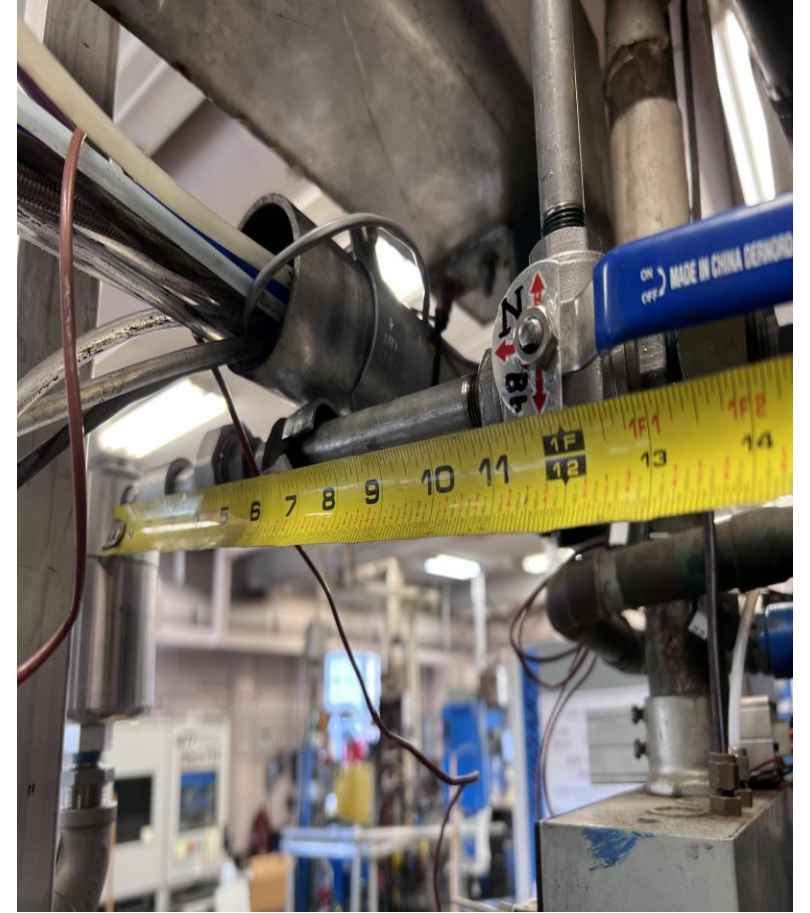
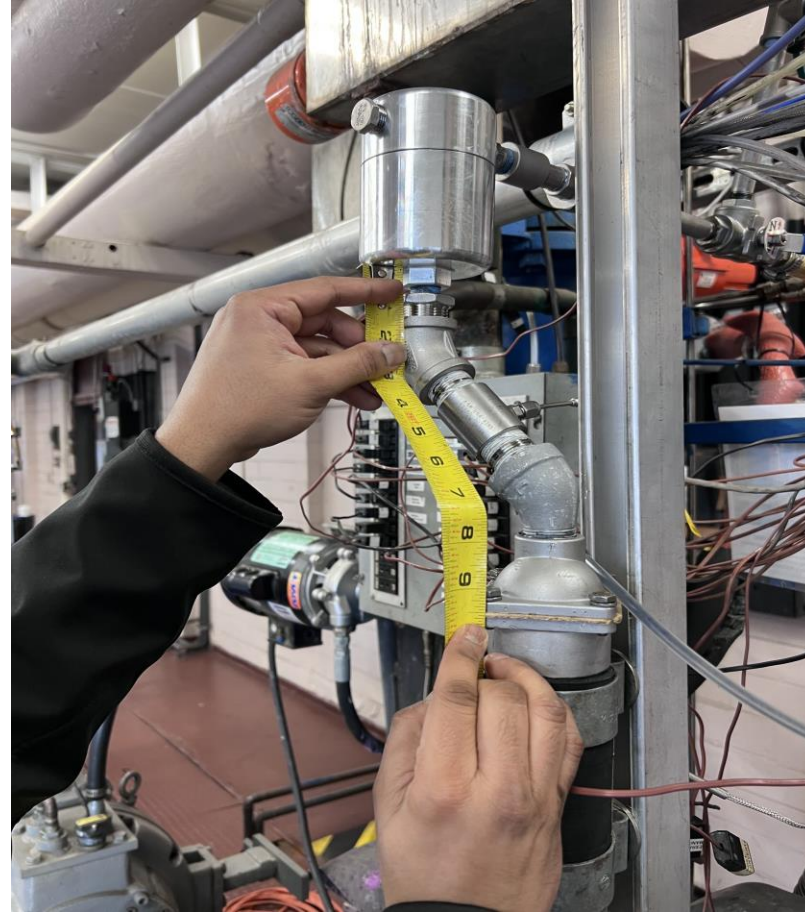
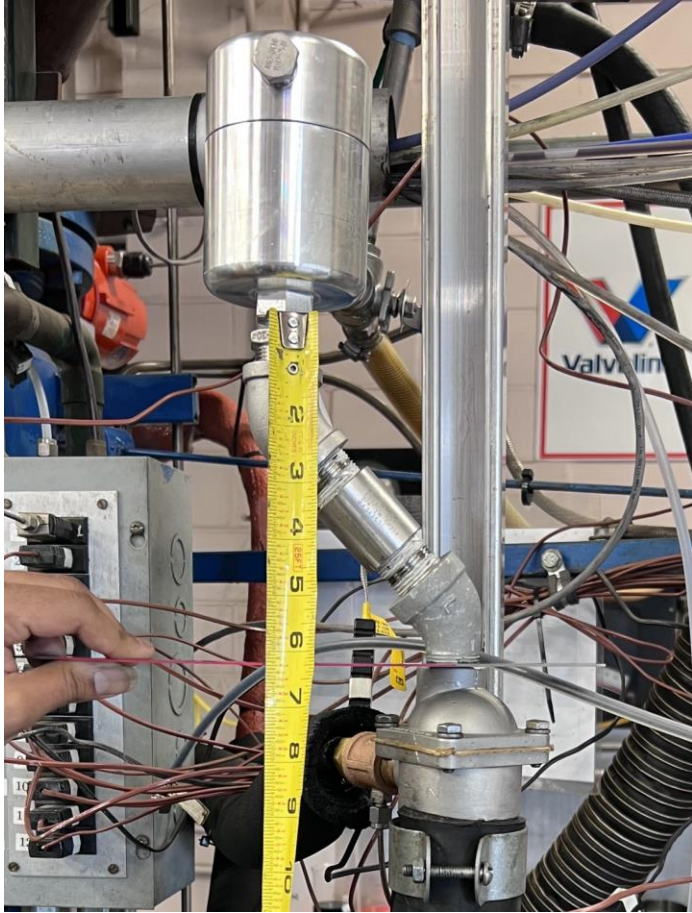


Photo Review - Valvoline



Photo Review - SWRI

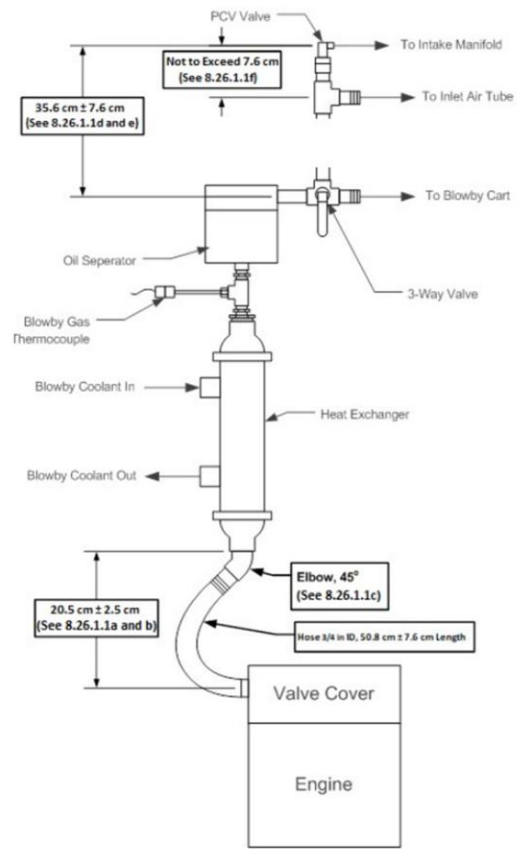
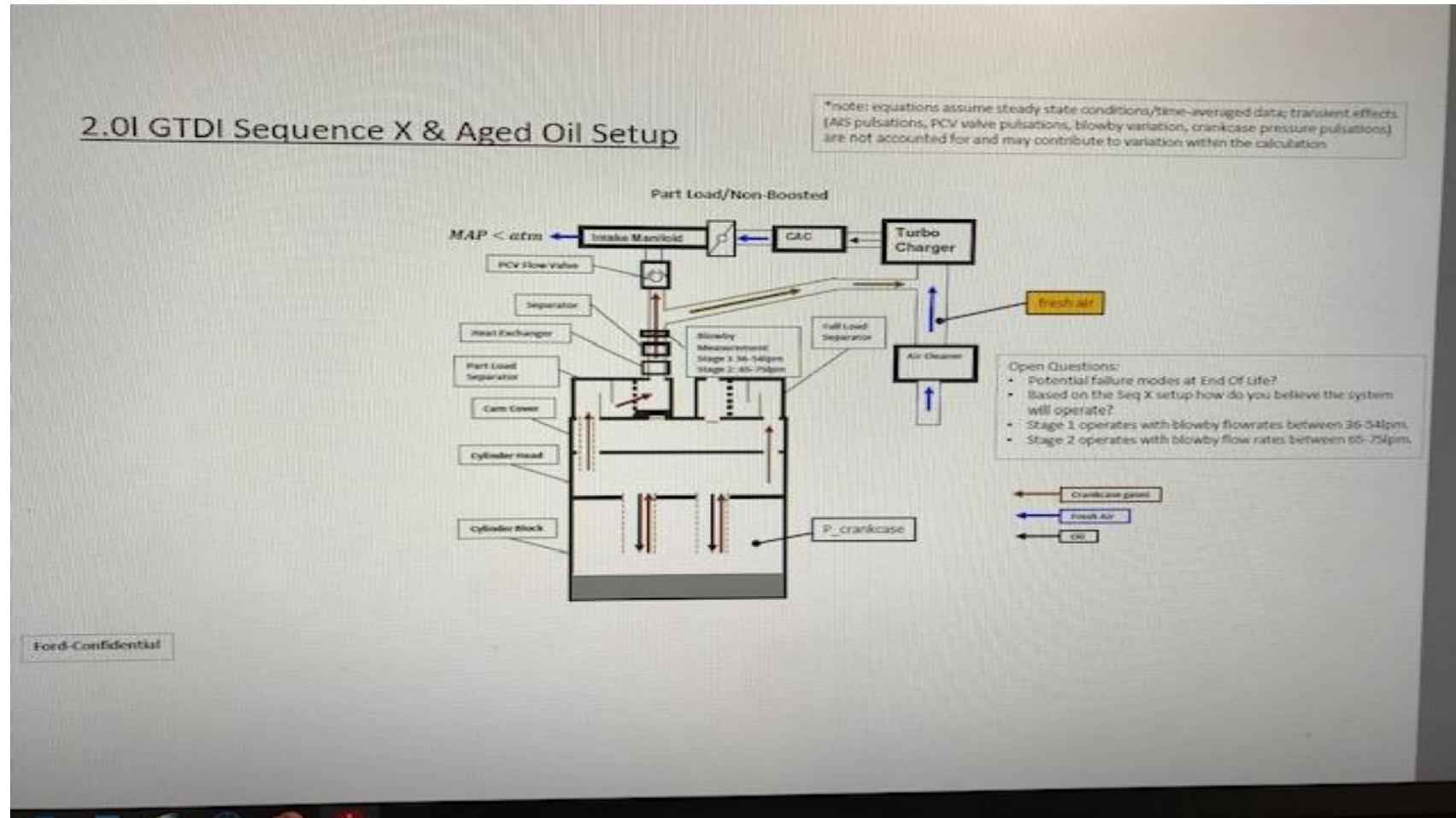


FIG. 4 Crankcase Ventilation System and Blowby Conditioning Critical Dimensions

Chain Wear Engine Crankcase Ventilation



Action List

Task Force Formed	June 2020	First Meeting August 2020		Action
Operational Data Review	March 2021	Travis presentation	Fuel correlation to mild shift found	
Fuel COA analysis		Met with Haltermann, no differences found between batches	Christine met with SWRI fuel team, no other analysis was recommended	
Crankcase Experiments	Ongoing	IAR, Valvoline ran tests, fixed orifice in BB stack. Valvoline 1011 on target (.1258 Yi=). More sludge and emulsion noticed in the engine. Oil 270 on target (.1165)	LZ test showed correlation, ran high CC pressure by accident	Done, all tests on target with orifice
		Oil separator filter		
Ln Transform Review	Ongoing	Stats group meeting regularly	Transform options to be presented	
Oil 271 Suspended	04/07 - 06/07	Panel Motion		
Cylinder honing	4/13/2021	Labs commonized honing techniques. Ra target 9-13	Revised procedure, agreed to hone new blocks as well as used. May want to look at other surface parameters	Done - ballot
Torsional Analysis		Driveline Manufacturere	Called Machine Services - no change in material or design, same stiffness	done no change
		Clutch pack	Called OHT - no change	
		Crank/Hub	Engine batches changing but labs using sme harmonic balancer from original engines	Review combination. Ask engineering on possible mismatch
Hardware batch timeline	5/25/2021	Lab Review	No correlation found with a change of hardware	
Chemistry		Travis- slides on TAN, TBN, water. No correlation seen	Amol recommendation to review oxidation, nitration, pentanes, TAN, TBN	Method of reporting, which should we use?
CC Pressure Data		Missing data on TMC site	Rich completing review of CC correlation	Labs to input data
Action on Amol		Test on 271 w/orifice plate		Done on target
		Chem analysis on orifice plates	Travis plots	Done - review was inconclusive
Water Analysis		Is there another method that best distinguishes the 3 modes of water in oil	Currently used method D6304 Karl Fischer	
Heat exchanger flow directon. Procedure mismatch		Labs to commonize	E ballot - procedure corrections	Done - ballot

Action List

PCV design change	1/18/2022	M Deegan to verify PCV valve print and any changes	No changes since 2012	Done
Build Data	1/18/2022	Lab to compare build data	IP issue - no participation	
Lab Visits		On hold due to Covid	Video reviews	LZ, IAR, SWRI, Valvoline complete
Piping between the HX and the oil separator	1/18/2022	No standard in the procedure	Labs to measure and photograph	LZ, IAR, SWRI, Valvoline complete
Hose diameter from the BB valve to the air box tube	1/18/2022	No standard in the procedure	Labs to measure and photograph	3/4 standard
Review map data in second stage	1/18/2022	Need to re-analyse and compare to barometric pressure. May be a boost influence on the pcv valve	Plots for review on Feb 8th	
Measure BB flow rate	1/18/2022	Determin distributioj of flow in first and second stage. Measure both legs, vary torque near boost		
MD PCV review	1/18/2022	Mike to consult with Ford engineer on the flow characteristics of our stand set up. Near boost condition, at different pressures.		
BB Gas T/C	1/25/2022	Orientation may be influenced by drainback	Labs are not plumbed the same. Original configuration at IAR, Afton, SWRI. LZ, Afton installed 45 degree elbows. LZ to install y pipe and measure bb gas temp	