Sequence VH O&H Meeting
July 9th, 2024 at 3PM EST via MS Teams

Attendees: Rich Grundza, Al Lopez, Tony Catanese, Ben Maddock

Overview:

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

Notes:

1. **Build Workshop Actions**

Intertek – Complete

- 7.8.5.1: Ring grinder bit part number SA-81 CYL S/C
- 7.8.4.1, Step 5: Defines brushes
    - **OHT3G-096-1** is the required brush

From: Jason Bowden <jhbowden@OHTech.com>
Sent: Monday, June 3, 2024 10:11 AM
To: Alfonso Lopez Intertek <al.lopez@intertek.com>
Cc: Matthew Bowden <mjbowden@ohtech.com>
Subject: [External] RE: VH O&H Call

Al,
Good morning.

Please find below and attached some additional background information relating to the honing brushes that OHT supplies. Thank you for your patience, as I was traveling last week.

Charlie Leverette led an effort to review differences in the honing brushes that were being utilized by labs. Although the part numbers were the same, as supplied by Sunnen, there were differences in the honing brushes. OHT worked with Sunnen to develop a custom brush based off the original C30-PHT-731, with tighter tolerances, that would provide a more uniform strand count targeting approximately 175 strands. OHT does currently still have inventory of these brushes. These were originally designed to support both the Seq. III and the Seq. V.

Please find attached two documents relating to the honing brush discussions that occurred in 2010.
1.) Seq III Panel meeting minutes 11-19-2010. (Attachments show the differences in brushes over time)
2.) File OHT provided to the Surveillance Panel showing differences in honing brushes.

I hope this information helps you. I would be glad to join the Seq. V O&H panel to discuss any additional topics that come up as well.

If there is anything else that we can do to assist, please do not hesitate to contact us.

Best regards,

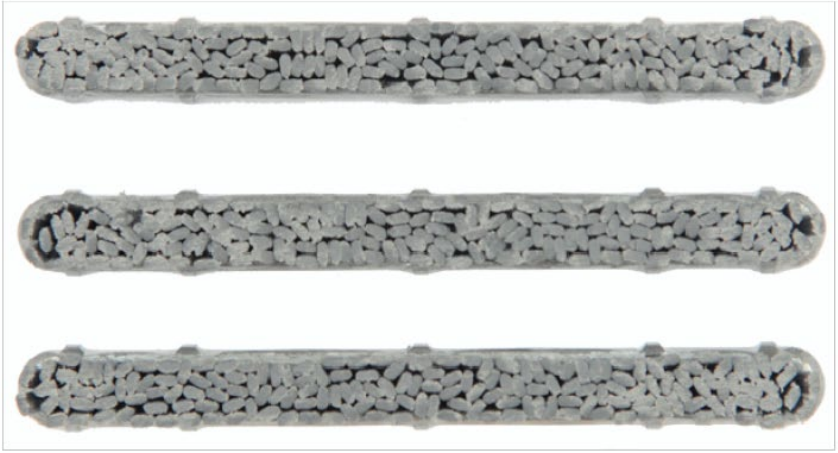
Jason H. Bowden
OH Technologies, Inc.

C30-PHT-731
Sunnen Honing Brush Comparison

Original

Current

New OHT Honing Brush Samples Based on Original Print (~170)



[Microsoft Word - Teleconference Meeting Minutes 11-19-10.doc (astmtmc.org)]

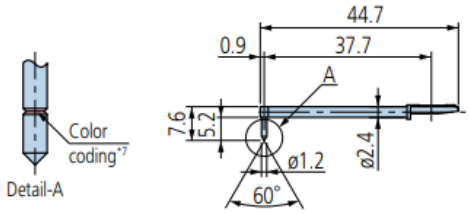
Afton – Complete

7.8.4.1 The group to standardize on identical surface analyzer

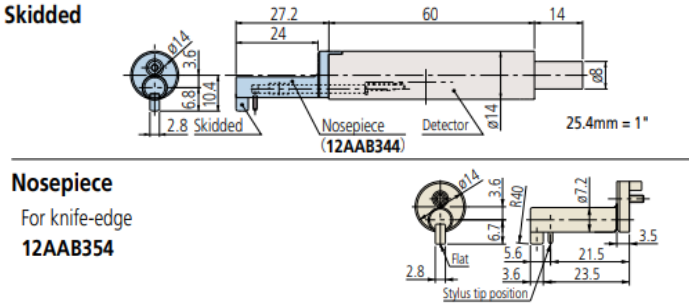
- Manufacturer: Mitutoyo
- Model: SJ-410
- Hand tool: SJ-411 = 1” drag
- Touch Screen Display: SJ-410
- Cable (Part # 06AFM380D)
- Stylus: (Part # 12AAE882) 1 um

Standard stylus

12AAE882 (1 µm)
12AAE924 (1 µm)*5
12AAC731 (2 µm)
12AAB403 (5µm)*5
12AAB415 (10 µm)*5
12AAE883 (250 µm)*8
( ): Tip radius



- Detector and Nose Piece: Skidded detector and knife-edge Nosepiece (Part #12AAB354)



Configuration:

Analyzer type: Surface Roughness Measurement
Measurement principle: Contact Stylus Method (Skidded)

Analyzer Settings:
Measurement Units: um, mm, Inch
Calibration requirements: Regular Calibration As per Procedure using the Included Roughness Specimen W.

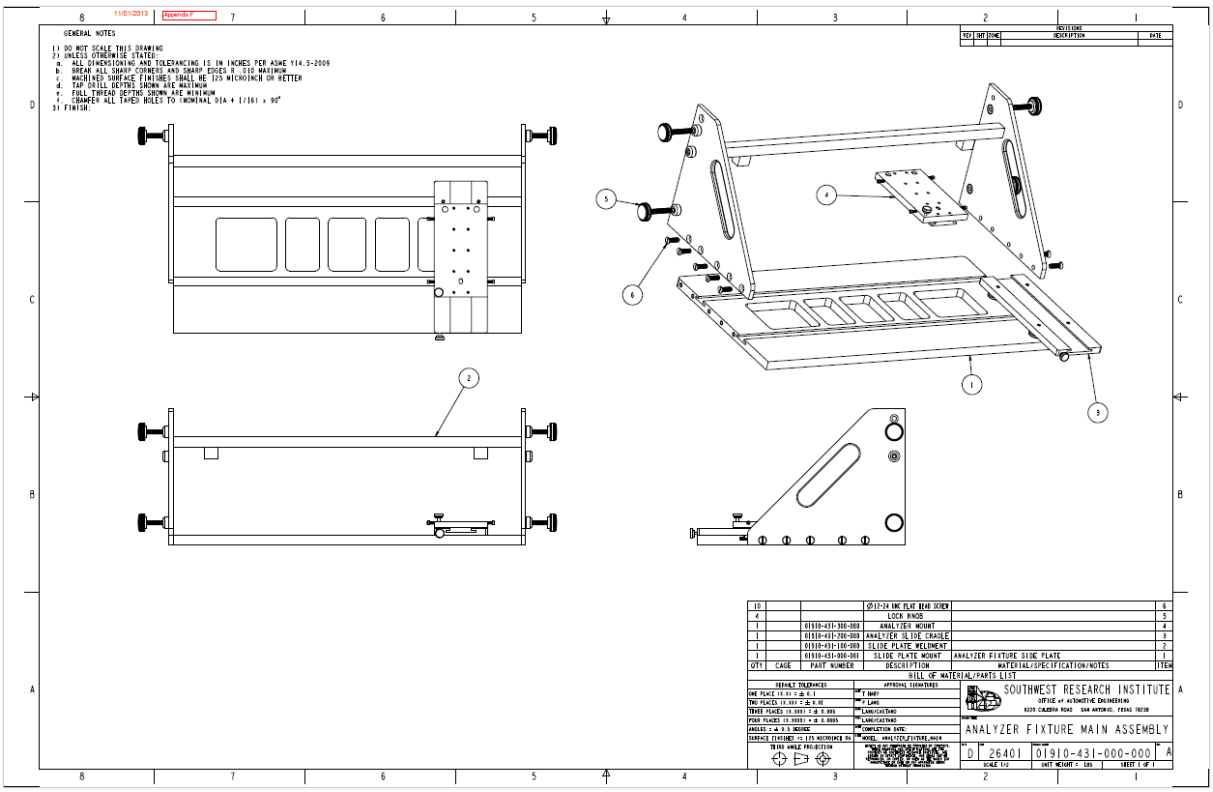
Software and Filtering:

Software Version: Mitutoyo Proprietary software
Description of Software filtering: A GAUSS or Gaussian filter
Data Transfer Methods: Data is transferred to honing machine computer via USB cable (06AFM380D) (Wireless is available VIA U-Wave Module (Part # 02AZD810D)

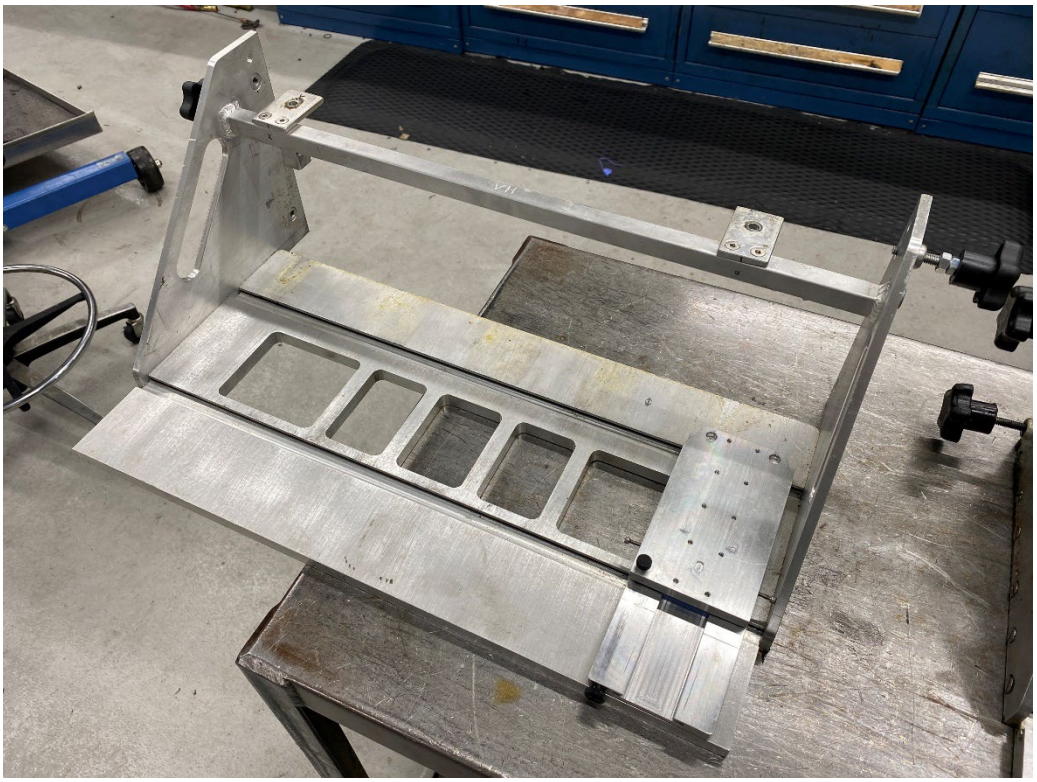
Measurement Locations:

Standard Measurement Locations on Ford 4.6L engine:
All surface Measurements are taken Approximately ~~1.5"~~ 30mm from the top of the cylinder wall (headgasket mating surface).

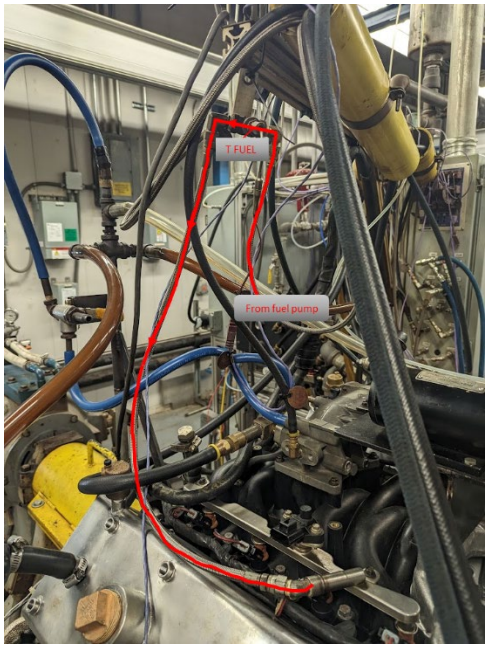
Surface Hand stylus Analyzer mounting Bracket:



GMOD Test Stand Manual 12-21-15.pd



SwRI:

- Fuel temperature control
    - Labs to investigate on what's typical and where to land
        - Afton: 30 to 45 C
        - Intertek: 29 to 42 C
        - SwRI: 20 to 42 C
        - Valvoline: Similar range
    - Identify Fuel Rail temp location
        - Intertek & SwRI: ~2ft from fuel rail
        - Afton: ~6ft from fuel rail
        - 

    - Add to op data study to help guide
        - Rich to add to Op Data Study template

- Verify fuel injector prep requirement - TBC
    - Hot pink (latest superseded #) are regarded as lower quality
    - Do all the labs comply?

Valvoline: - No action from Valvoline

- Blowby tree cleaning was questioned but no fully explored
    - Hose replacement frequency?
- Bore gauge tip diameter definition
    - Poll the labs to identify commonality that may already exist

Lubrizol: - The group has agreed to table this topic until issues such as honing equipment, surface measurements, op data analysis and fuel temp control are addressed. This will likely just be accomplished during the next fuel approval matrix.

- 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.

2. Fuel

- Afton received 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

Description	AO Content (ppm)
Before from Haltermann	0.3
Truck	0.7
After from Haltermann	9

  - Analytical team working on titrating samples to verify accuracy

- Afton will also work to formalize a procedure for all analytical labs to use so that they're empowered to perform the same analysis
- No update on 6/4/2024, 7/10/24

- Lubrizol sent Haltermann Solutions a sample of their bad fuel with high washed gums to help understand what occurred

3. Hardware

- FCS Order through TEI
  - A concern was raised about where these overstock pistons come from?
    - A set of pistons back in early VH days was rejected due to excessive staining
    - Ford will supply a sample from each size to TEI and/or Intertek to evaluate condition
  - Al received a set of 0.5 over pistons, pending measurements will then signal to TEI and FCS to buy the remaining.
- TEI Dyno harness unavailable
  - 10-week delay with no clear path from supplier
  - Tim Cushing (GM): TQI may be an optional source for seq V test harnesses.
    - Dan Dyer ddyer@tqionline.net 931-372-0575
    - Brandon Spivey bspivey@tqionline.net
    - Another option may be Direct Connect
- Camshafts
  - Original manufactured by Romeo Engines who are no longer in business
    - Deegan is looking for the forgings to supply alternate supplier such as IMTS

4. Operation

- Honing Data from PM was shared by the TMC and briefly reviewed as a group with no significant follow-up actions defined

    - Labs agreed to standardized on measurement technique first, ensure all labs are taking required surface parameters to calculate crevice volume, then leverage next fuel approval matrix data to redefine Ra into modern parameters

- OSCR
    - TMC supplied a summary to this group
    - Get them together and land on the approach
    - Blow down flow rate
    - Loss of oil pressure in Stages 1, 2 and 3
    - Oil Pan Ratings
    - Action: Look at data

- Operational Data Study: N-10-1 approval matrix vs PM
    - Proposed timing: Labs to provide data in the correct format for analysis by 7/30/2024 due ASTM week and July 4th

Seq VH O&H Panel Update – 7/11/2024

1. Build Workshop actions
2. Hardware
3. Operation
4. Fuel Analysis

VH Build Workshop – April 2024

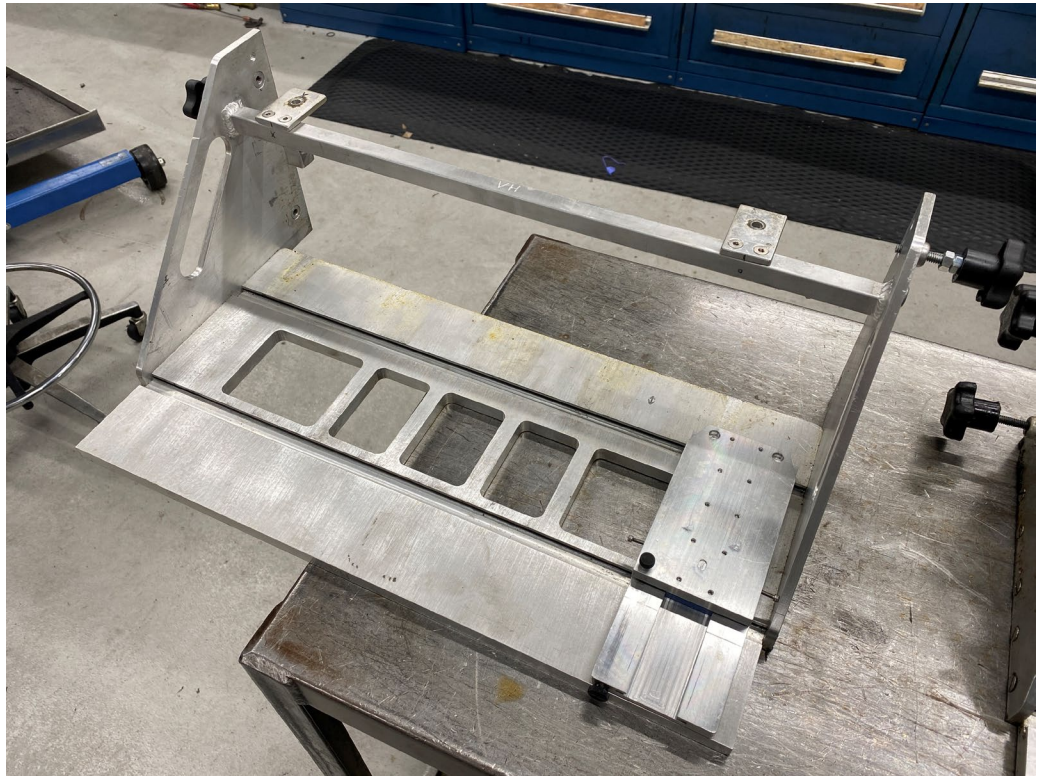
- **<u>Motion</u>**: Accept changes to the procedure to define required part numbers for the following sections
  - 7.8.5.1: Ring grinder bit part number SA-81 CYL S/C

  - 7.8.4.1, Step 5: Brush part number OHT3G-096-1
    - Microsoft Word - Teleconference Meeting Minutes 11-19-10.doc (astmtmc.org)

VH Build Workshop – April 2024

Progress continues on other topics but not prepared to make motions

- Expected motions:
  - Surface analyzer part numbers
  - Modified GMOD analyzer fixture
  - Fuel temperature instrumentation
  - Fuel temperature control



Hardware

- Ford Component Sales (FCS) Order
  - TEI acquired sample of overstock pistons that passed visual inspection at Intertek. Measurements are being conducted prior to purchasing the lot
  - Once overstock are purchased and distributed, additional FCS order will be placed for the remaining quantity of pistons required by the labs

Size	Quantity
0.125	272
0.250	272
0.375	272
0.500	400

- Camshafts
  - Ford working to locate original Romeo Engine forgings to supply to alternative supplier

Operation

- Op Data Analysis – N-000010-1 Fuel Approval vs Precision Matrix
  - TMC provided template for labs to populate + Fuel Temperature
  - Proposed timing: Labs to provide data by ~~6/21/2024~~ 7/30/2024

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	

Operation

- Oil Screen Clogging (OSCR)
  - Request the Rating group to convene and define a method to handle the Sequence VH oil screen ratings
  - If the objective of quantifying oil screen clogging is to prevent sludge build-up from starving the engine of oil pressure, the O&H group is considering alternative measurements
  - Alternatives discussed:
    - Flow measurement with blowdown device
    - Oil pan ratings
    - Oil pressure delta, SOT vs EOT

Fuel Analysis

- No update