Sequence III Surveillance Panel Meeting

Teams
Wednesday September 16, 2026 1:00 – 2:30 PM CST

Agenda

1.0) Attendance

2.0) Chairman Comments

3.0) Approval of minutes

Approval of 8/19 minutes next month

4.0) IIIH Action Items

4.1) Fuel Update – Haltermann

- Status quo ~200,000 gallons available, no issues.

4.2) CPD Update - OHT

- No issues on current hardware.
- Prototype pistons at OHT, working to obtain rings.
- Ordered 100 sets of each size.
- Target ring delivery end of October.

4.3) Hardware Contract Team – Andrew

- No major updates, awaiting hardware.

4.4) IMTS update including machining and parts timing – Sid

- Dave mentioned that he is talking to Stellantis multiple times per day trying to get the delayed Mopar parts delivered. He has been told material should be available next week

4.5) Piston and Ring prove out testing discussion - All

- Sid and Pablo discussed reusing the timing chain assembly. This will be in the build manual. Sid is currently updating section 4 sheet 5: Cleaning and Prep.
- Will clarified that the 100 sets of Mopar parts was an abbreviated set. Can we get the new parts we need?
- Sid said that new oil pumps, housings etc. will be supplied.
- Andrew added that the contracts team did not ask for all new parts, they are working on a reuse list.

4.6) SwRI Oversize piston testing update - Will

- Will discussed the SwRI completed several tests using 0.020 oversize service pistons as a backup plan. This is a potential stop-gap. SwRI cut the rings to match current gaps and honed the block as normal. The presentation is attached.
- Will explained that test 4 aborted at 67 hours due to the second ring on cylinder 6 failing.
- The PVis results ranged from 0.5 to 1.2 sigma severe. The results were relatively close to target. The three completed tests had results within the reference oil acceptance bands.

- Pistons were from Summit and Rock Auto. When asked, Will agreed to share oil consumption data.
- George asked about the ring failure. The engine shut down on torque at 67 hours. The ring was in multiple pieces. There was oil on the valves of cylinder 6.

4.7) Other Topics – All

- Prove out update from Pablo. He has run rebuilt test engines with all new dealer parts, and another test with almost all parts reused. Pablo has seen both black and tan guides – he will check his used guides.
- Bob thanked Pablo for his work. Timing is critical. We may need a rebuild matrix. As an industry, 0.5 sigma is a big deal for candidates. Interesting data, pretty close to what we had hoped for.
- Joe pointed out that we need to understand both precision and severity.
- Bob explained that we need to treat candidates the same. If the 0.020" oversize progresses the results must be treated like the big batch parts. We can use provisional licensing if the outage is only for a few months.
- There was a discussion between Venkat, Joe and George about the pros and cons of progressing with service size pistons.
- SwRI thinks their rebuild path works. Lochte clarified that SwRI did not have any parts to tests and wanted to remain productive.
- Travis added that the results were close to target so we wouldn't need a large ICF.
- Venkat verified that the operation was the same.
- Sid added that IMTS also had already placed an advance order for a larger batch of pistons,

5.0) Old Business

5.1) TBD

6.0) New Business

6.1) TBD

7.0) Review / Update Scope and Objectives

8.0) Next Meeting

October 21, 2026

9.0) Meeting Adjourned

Sequence IIIH 20 Over Piston Comparison

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20 Over Test Procedure by SwRI

1. Measured 20-over pistons
2. Block sent to machine shop to be bored out within .002” of final bore measurement.
3. Block honed per IIIH procedure. Piston to Wall Clearance of standard IIIH test kit and block matched on the 20 over build.
4. Cut rings so that gap is within IIIH procedure limits while installed in the bore for that cylinder.
5. New Main Bearings and Connecting Rod Bearings were installed. Same grades and positions were used to maintain the same clearances.
6. All timing chains, tensioners, and guides replaced
7. Cylinder Heads reused without replacing valves, etc.
8. Camshafts reused.
9. Conducted Sequence IIIH test with Haltermann EEE following standard test procedures, control parameters, and QI requirements.

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First 20 Over SwRI test – Haltermann/436

- Haltermann EEE
- New parts sourced from Dealer
- Pistons and rings sourced from Summit Racing
- 436 reference oil

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Second 20 Over SwRI test – Haltermann Carless/436

- Haltermann Carless EEE (different fuel supplier than standard test)

- Used parts sourced from previous IIIH test at SwRI
  - Oil Pump
  - Oil Cooler
  - Timing Set
  - Crank, Cams, lifters, rockers, phasers
  - Rods
  - Cylinder Heads (full assembly reused, this was 3rd run on this set of heads)

- New Parts installed:
  - Mahle 20 over pistons with rings (cut to IIIH gaps) – Sourced from Rock Auto
  - Main bearings (matched factory settings)
  - Rod bearings (matched factory settings)

- 436 reference oil

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Third 20 Over SwRI test – Haltermann EEE/434-3

- Test was conducted on Haltermann EEE (current standard IIIH test fuel)
- New parts sourced from Dealer
- Pistons and rings sourced from Rock Auto
- 434-3 reference oil from TMC

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Fourth 20 Over SwRI test – Haltermann EEE/434-3

- Test was conducted on Haltermann EEE (current standard IIIH test fuel)
- New parts sourced from Dealer
- Pistons and rings sourced from Rock Auto
- 434-3 reference oil from TMC
- Aborted at 67 hours of test time due to failed 2nd ring on Cylinder/Piston #6

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Comparison Data Set

1. LTMS Historical Data
   - LTMS Data from approximately the past two years (Since July 26, 2024)
   - All Chartable Data
2. IIIH 0.020” Over Data
   - All tests conducted on SwRI Stand 69, which is LTMSAPP A6.
     - A6 reference data is shown individually alongside historical data for direct comparison.

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PVIS Results Summary Table

PVIS results thus far are well within the range of acceptable results.

Oil	LTMS Target	0.020 EEE (Yi)	0.020 HC (Yi)
436	27.9%	35.3% (0.59)	34.1% (0.50)
434-3	317%	698% (1.19)	-

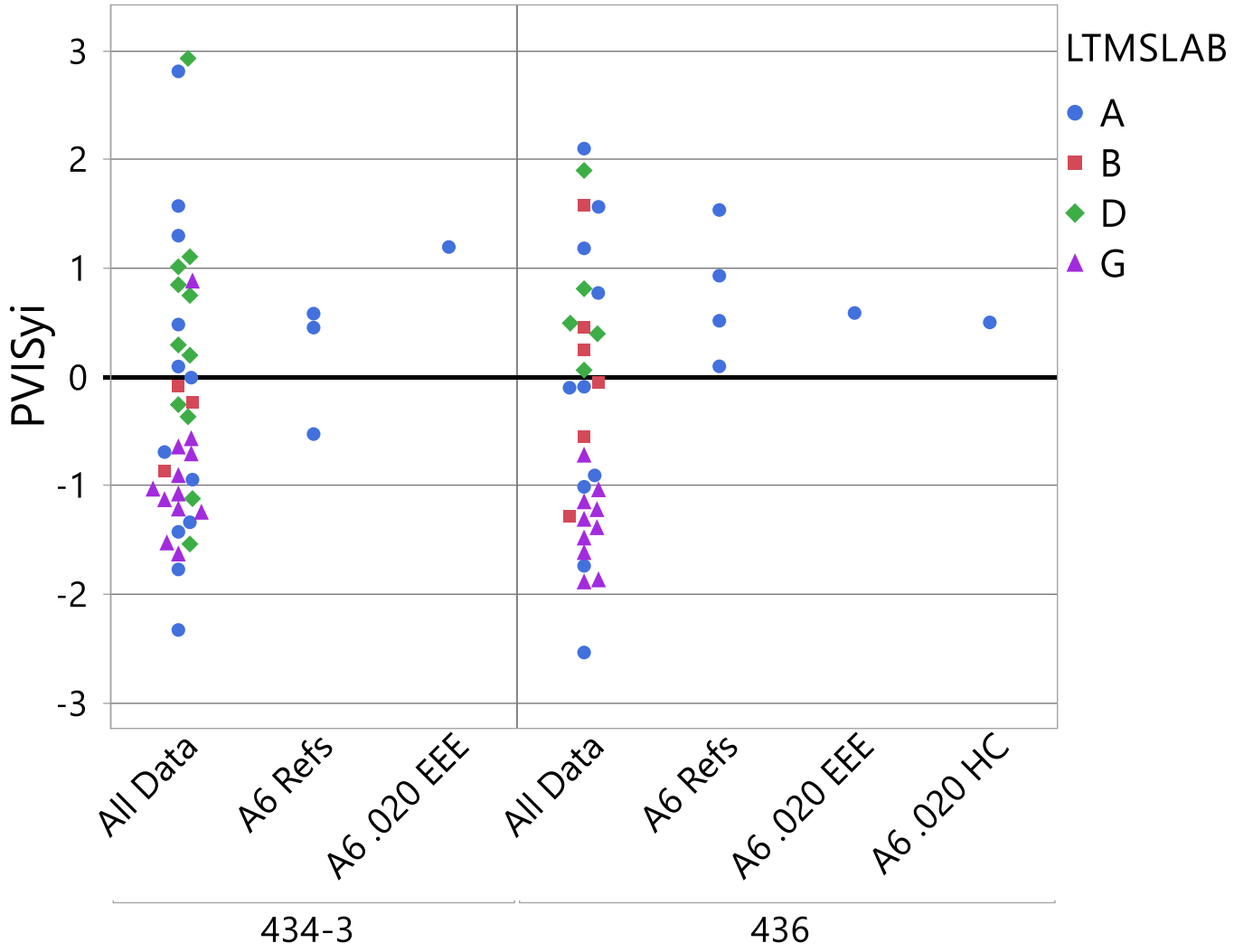
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PVIS Comparison to Historical Data

PVIS results are similar to the historical data and well within the acceptable ranges for the test.

PVIS Yi Comparison

Oil	All Industry Avg.	A6 Refs Avg.	0.020 EEE	0.020 HC
436	-0.34	0.77	0.59	0.50
434-3	-0.27	0.17	1.19	-



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WPD Results Summary Table

The WPD results thus far are within the range of acceptable results.

Oil	LTMS Target	0.020 EEE (Yi)	0.020 HC (Yi)
436	4.63	4.65 (0.06)	4.81 (0.53)
434-3	4.16	4.76 (1.43)	-

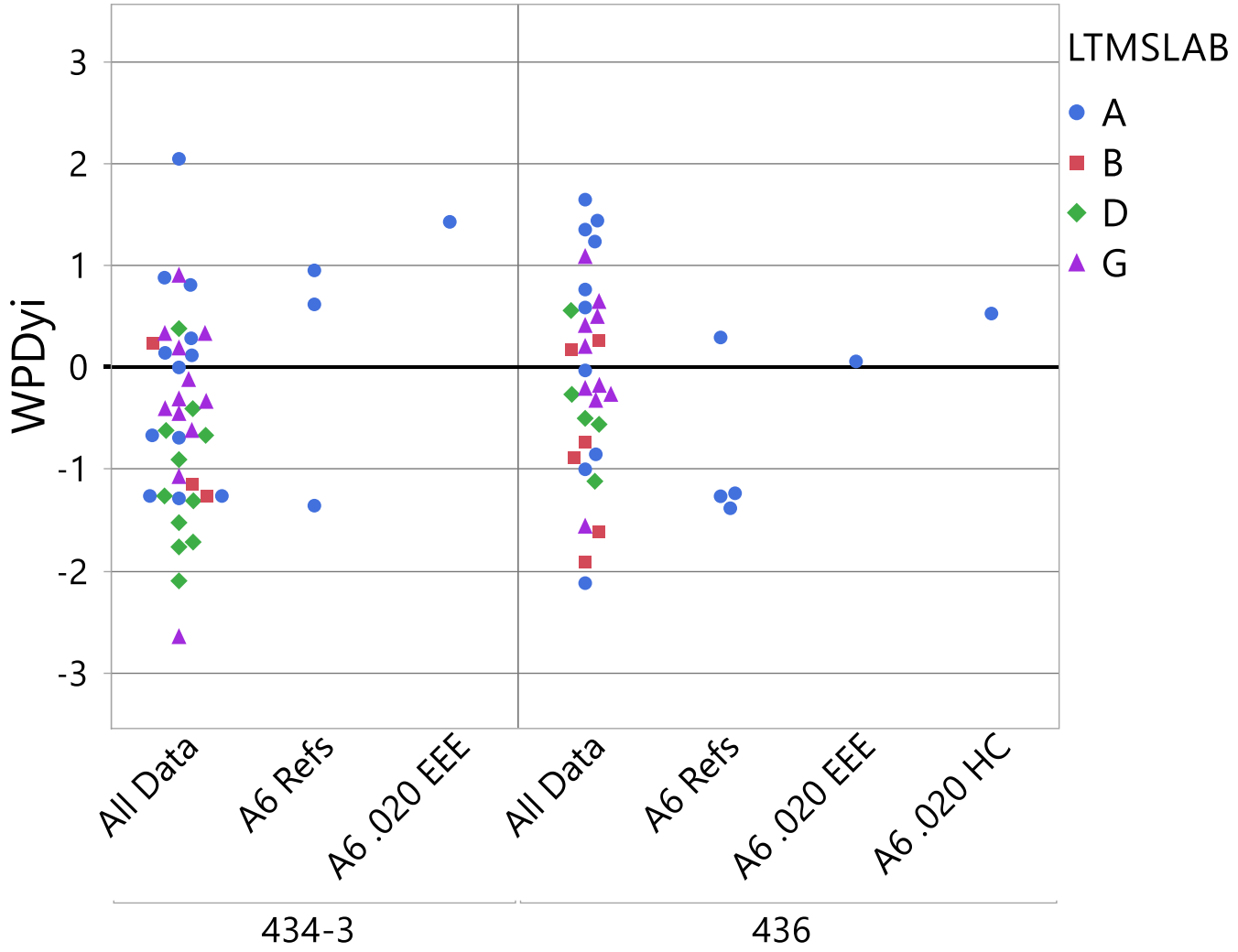
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WPD Comparison to Historical Data

Tests are well in range of acceptable results, though the single 434-3 test is on the mild side compared with historical slightly more severe data.

WPD Yi Comparison

Oil	All Industry Avg.	A6 Refs Avg.	0.020 EEE	0.020 HC
436	-0.10	-0.90	0.06	0.53
434-3	-0.50	0.07	1.43	-



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Summary

- The SwRI 0.020" oversized bore tests produced PVIS and WPD results well within acceptable ranges.
  - One test completed successfully on used parts and a different fuel supplier.
  - All engines built and ran to IIIH procedure (honing, ring gaps, test conditions)

- Piston and ring kits sourced from both Summit Racing and Rock Auto.

- This offers a viable option as a stop-gap for the industry.

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Appendix

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APV Results Summary Table

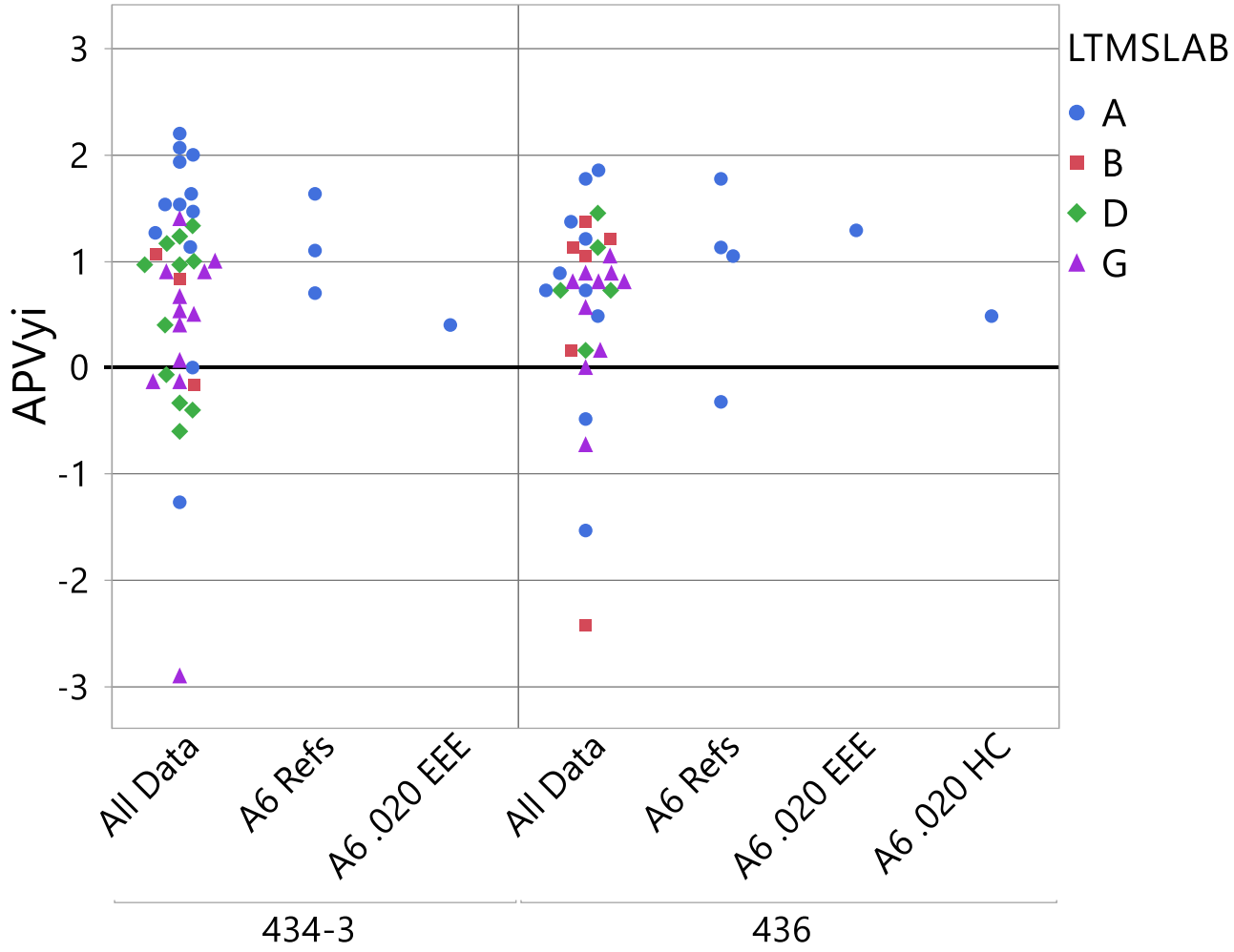
The APV results thus far are well within the range of acceptable results, but all slightly mild.

Oil	LTMS Target	0.020 EEE (Yi)	0.020 HC (Yi)
436	9.71	9.87 (1.29)	9.77 (0.48)
434-3	9.16	9.31 (0.40)	-

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APV Comparison to Historical Data

The 0.020 tests are similar to the historically slightly mild data.



APV Yi Comparison

Oil	All Industry Avg.	A6 Refs Avg.	0.020 EEE	0.020 HC
436	0.61	0.91	1.29	0.48
434-3	0.69	1.14	0.40	-

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Piston Comparison Pictures

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Piston Notes

Summit Racing Mahle Pistons

- Pistons from Summit Racing had to be ordered separately from the Piston Ring kit as the "With Ring (WR)" kits were unavailable.
- Piston wrist pin boss has cross hatching that is same as OHT

Rock Auto Mahle Pistons

- Pistons from Rock Auto were available for purchase as a WR kit.
- Pistons had vertical lines on wrist pin boss which differs from OHT style.
- SwRI has utilized Rock Auto piston kits in all tests except for the first 20 over test.

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EXAMPLE

"Test Kit"



"20 Over"



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Top





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Under Crown





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Front





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Rear





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Anti-Thrust



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Thrust



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EOT Ratings Breakdown of 20 Over Pistons – Haltermann/436

Un-weighted Piston Deposits, merits										Weighted Piston Deposits	
	Grooves			Lands			Piston Boss Varnish				
	1	2	3	2	3	Undercrown	Front	Rear	Average		Merits
Piston 1	1.50	0.74	9.25	1.01	1.40	7.78	9.87	9.88	9.88	Piston 1	4.34
Piston 2	1.57	0.76	9.69	1.09	3.56	8.65	9.90	9.89	9.90	Piston 2	5.18
Piston 3	0.75	0.75	9.54	0.74	0.91	8.03	9.84	9.84	9.84	Piston 3	4.19
Piston 4	0.75	0.75	9.63	0.83	3.96	8.80	9.89	9.84	9.86	Piston 4	5.22
Piston 5	0.75	0.75	9.44	0.72	1.92	8.30	9.87	9.85	9.86	Piston 5	4.50
Piston 6	0.75	0.75	9.44	1.08	1.66	8.46	9.88	9.87	9.88	Piston 6	4.49
WF	0.05	0.10	0.20	0.15	0.30	0.10			0.10	Average	4.65

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EOT Ratings Breakdown of 20 Over Pistons – Haltermann Carless/436

Un-weighted Piston Deposits, merits										Weighted Piston Deposits	
	Grooves			Lands			Piston Boss Varnish				
	1	2	3	2	3	Undercrown	Front	Rear	Average		Merits
Piston 1	3.56	0.75	9.03	0.67	0.75	3.83	9.88	9.78	9.83	Piston 1	3.75
Piston 2	4.45	1.11	9.43	1.93	6.03	4.90	9.56	9.56	9.56	Piston 2	5.76
Piston 3	1.16	3.03	9.45	0.86	9.25	4.12	9.76	9.72	9.74	Piston 3	6.54
Piston 4	2.29	0.69	9.86	0.64	3.55	4.76	9.87	9.85	9.86	Piston 4	4.78
Piston 5	0.75	0.75	9.49	1.19	2.25	3.61	9.80	9.79	9.80	Piston 5	4.20
Piston 6	0.81	0.74	9.67	0.61	1.00	4.24	9.84	9.84	9.84	Piston 6	3.85
WF	0.05	0.10	0.20	0.15	0.30	0.10			0.10	Average	4.81

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EOT Ratings Breakdown of 20 Over Pistons – Haltermann EEE/434-3

Un-weighted Piston Deposits, merits										Weighted Piston Deposits	
	Grooves			Lands			Piston Boss Varnish				
	1	2	3	2	3	Undercrown	Front	Rear	Average		Merits
Piston 1	0.75	2.69	7.06	0.76	5.77	4.11	9.47	9.02	9.24	Piston 1	4.90
Piston 2	0.73	5.32	8.04	1.28	5.57	5.10	9.58	9.14	9.36	Piston 2	5.49
Piston 3	0.75	1.92	6.75	0.89	5.65	3.88	9.34	9.37	9.36	Piston 3	4.73
Piston 4	0.75	0.87	7.48	1.23	6.91	4.89	9.64	9.37	9.50	Piston 4	5.32
Piston 5	0.75	1.09	6.83	0.70	4.77	3.74	9.24	9.26	9.25	Piston 5	4.35
Piston 6	0.88	0.75	7.76	0.64	2.27	3.72	9.37	8.96	9.16	Piston 6	3.74
WF	0.05	0.10	0.20	0.15	0.30	0.10			0.10	Average	4.76

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ASTM Sequence III Surveillance Panel (19 Voting members) date: 9-16-2026

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