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**ASTM Sequence VG Operations and Hardware Sub panel  
September 17, 2002  
9:00 am – 2:30 pm  
Detroit, Michigan**

**Meeting Secretary**

Gordon Farnsworth took the minutes for this meeting.

**Motion and Action recorder**

Ben Weber recorded action items and motions. See Attachment 1.

**Minutes from July 16, 2002 meeting**

The minutes were accepted unanimously as issued.

**Membership changes**

There were no membership changes announced. See Attachment 2 for attendance.

**Review of action items from last meeting**

Dan Worcester reviewed these verbally as no hard copy was available. No action items were indicated as outstanding.

**VG Romeo matrix**

**Runs per engine block:** The original plan (2000) was to get two tests per engine block (0.250 and 0.500 *mm*) over size. It was now proposed that an engine block be used for four runs (0.125, 0.250, 0.375, 0.500 *mm*) over sizes since bore wear with the VG is low, engine honing time is reduced for smaller engine bore size changes, and four runs per block is more cost effective. The following motion passed unanimously.

***Motion*** by Dan W and seconded by Rich G - This group agrees that we will use 4 runs per block with the new VG Romeo hardware based on technical experience. This group also technically agrees to run the prove-out matrix using 0.125 and 0.500 mm oversize as a minimum.

**Rebuild of current AER heads:** This discussion covered two items a.) use of AER heads on Romeo engines instead of increasing test length to match current VG (AER engine)

severity, b.) Reworking cam journals to reduce cam bushing wear – this topic will be covered under the agenda item further in these minutes. See Attachment 3. Dan Worcester presented data from three tests showing that fuel dilution is significantly lowered with Romeo engine / cylinder heads relative to current VG experience. The use of AER cylinder heads on Romeo engine blocks gives fuel dilution similar to current VG experience. Dan recommended that AER heads be used with the Romeo engines to maintain appropriate test severity. However, after lengthy discussion the majority opinion was that increased test length (as agreed at May S.P. meeting) was the lowest risk approach to getting desired test severity with Romeo engines since limited test data indicates this works. The following motion passed unanimously.

**Motion** by D. Glaenzer and seconded by W. Buscher - We will use the 2000 model year cylinder heads for the prove-out matrix, and adjust test length to accommodate the proper test severity like was decided in May earlier this year. As a fall back position, the test labs should save their AER heads.

This group agreed that early prove-out testing would be done using dealer hardware rather than hardware supplied directly from FPP as listed in the test kits. Test kits from FPP will be available sometime in February 2003. W. Buscher will send an Excel list of all the required hardware to this panel.

Build workshop update: A VG Romeo build workshop was held in July the day following the O&H meeting. Many thanks to SwRI for sponsoring this effort. All labs were trained on the honing technique to be used, and differences in hardware and plumbing were noted.

Ford hardware support for matrix: B. Jecewski reported that he had approval to donate six engines for prove-out matrix activity.

1009 Oil for matrix: It was agreed that oil 1009 did not yet have enough test runs to confirm it's performance, thus oil 1006-2 was proposed as a replacement for the prove-out matrix. Daryl Baumgartner also suggested that a 15W40 HD oil be included to help assure HD technology is represented. He reminded the group that when the VE dual plug heads were introduced that severity for HD technologies shifted more than that for PCMO technologies. The following motions were unanimously approved.

**Motion** by Bill B and seconded by Dan W – 1009 will not be used in the prove-out matrix at this time because we have limited data on the calibration performance of it in the current AER hardware. We will use 925-3 and 1006-2 at a minimum.

**Motion** by Daryl B and seconded by Dwight B – Include a 15W40 oil as part of this prove-out matrix as additional information because of what happened in the VE when we went to the dual plug version. A minimum of 3 runs will be used in this matrix for this purpose. Lubrizol is willing to supply this oil. A minimum of 100 gallons must be supplied to the TMC for this effort.

Chairman Worcester agreed to schedule a teleconference during the week of September 23 (tentatively) to discuss the prove-out matrix design. The parameters are:

2 or 3 oils, 2-4 bore sizes, number of test labs, number of test stands, number of tests per lab. Two bore sizes (.125 and .500 mm) is what the group is liking right now. They also like only two oils right now. A third oil will increase the number of tests required. The first oil from each lab should be 1006-2 to make sure things are on target initially. The test laboratories should use the same ring gaps for at least the start of this matrix work.

It is expected to take about six weeks to get pistons and rings so the prove-out matrix is not anticipated to start until early November.

### **Cylinder bore measurements**

B. Jecewski noted that he had only received three used engine blocks to date and bore measurements had just been completed by EMDO. He is still analyzing the data. He has been measuring the thrust side of the #1 cylinder bore. Ford want laboratories to continue to send them used engine blocks from reference tests. Barry will supply the TMC with engine block identification coding so they can cross reference with the test CMRI code and then supply the engine test data. It was noted that PDI is currently in the development of a portable device that may be useable for making bore measurements similar to the Ford EMDO devise.

### **Hardware for sequence tests**

This topic was covered early in the meeting (out of agenda sequence) so that the Power Products representative, Kristin Randels, could be available. B. Jecewski started the discussion by reviewing the history of events that lead Ford to building 2000 model year 2000 engines for sequence VG use. The engine volumes were estimated on previous VE history and a desire for the VG hardware to last until the end of 2005 as a minimum. Unfortunately this estimate has now proven to be well in excess of real need and Ford is no longer in a position to be able to inventory the hardware so is requesting a one time buy. In November 2001 Ford sold ~1500 of these engines to AER. Ford now have 485 engines in inventory and their one time buy request has generated orders for only 136 engines. These orders will be filled the week of September 23. All remaining engines are expected to be 'scrapped' by year-end.

Engine parts kits have not been assembled yet but FPP will be working with Ventures to get these shipped in February 2003.

This group is requesting a teleconference of the Task Force to address how future Sequence VG hardware will be supplied to the testing industry. Barry is chairman of this group and will coordinate this.

### **Cam journals and head oil pressure**

Recent camshaft supplies have had journals that are rougher and more out-of-round than desired for VG test use as these can lead to reduced oil pressure in the VG with test time due to cam bushing wear. High wear also limits the reuse of cylinder heads unless the aluminum can towers are re-bushed. D. Worcester discussed test results from a run using a re-bushed cylinder head and he circulated some bushings for observation. He noted that these bushings are not pinned but this did not seem to be a problem as no bushings were spun in use. The following motion passed unanimously:

***Motion*** by W. Buscher and seconded by D. Worcester – Have the VG camshaft journals polished by OHT as an option for AER hardware and mandatory for Romeo hardware. A solution from the vendor will also be looked into. This option does not apply to the older style camshafts. The test labs are requested to send their camshafts to OHT by November 15, and then every 6 months thereafter.

### **Old business**

None.

### **New business**

The following topic was briefly discussed and tabled at this time because Barry had to leave the meeting. The O&H panel will follow through with this motion via a teleconference sometime next week. "Besides Ford Power Products, the new Romeo Sequence VG test engine, part number OG-804-AA, can also be procured from AER. Approval of this motion does not preclude Ford Power Products as a distributor, but merely offers another source for the exact same test engine. The quantities being purchased are left to the various testing laboratories, as in the case of the current request from Ford Power Products."

### **Adjourn**

The O&H panel adjourned at 2:30 pm and was followed by a brief surveillance panel meeting.

### **Special thanks**

The panel thanks SwRI, PE, and OHT for sponsoring the meeting room cost.

## **Attachment 1**

VG O&H Action Items

September 17, 2002

Romulus, MI

Recorded at the meeting by Ben Weber

1. Gordon will be the secretary for this meeting. Previous meeting minutes approved as written. No membership changes.
2. Motion by Dan W and seconded by Rich G - This group agrees that we will use 4 runs per block with the new VG Romeo hardware based on technical experience. This group also technically agrees to run the prove-out matrix using 0.125 and 0.500 mm oversize as a minimum. Passed unanimously.
3. Motion by Bill B and seconded by Dan W - 1009 will not be used in the prove-out matrix at this time because we have limited data on the calibration performance of it in the current AER hardware. We will use 925-3 and 1006-2 at a minimum. Passed unanimously.
4. Motion by Daryl B and seconded by Dwight B - Include a 15W40 oil as part of this prove-out matrix as additional information because of what happened in the VE when we went to the dual plug version. A minimum of 3 runs will be used in this matrix for this purpose. Lubrizol is willing to supply this oil. A minimum of 100 gallons must be supplied to the TMC for this effort. Passed unanimously.
5. This group agreed that early prove-out testing would be done using dealer hardware rather than hardware supplied directly from FPP as listed in the test kits. Test kits from FPP will be available sometime in February 2003. Bill B will send an Excel list of all the required hardware to this panel.

6. Motion by Dave G and seconded by Bill B - We will use the 2000 model year cylinder heads for the prove-out matrix, and adjust test length to accommodate the proper test severity like was decided in May earlier this year. As a fall back position, the test labs should save their AER heads. Passed unanimously.
7. Motion by Bill B and seconded by Dan W - Have the VG camshaft journals polished by OHT as an option for AER hardware and mandatory for Romeo hardware. A solution from the vendor will also be looked into. This option does not apply to the older style camshafts. The test labs are requested to send their camshafts to OHT by November 15, and then every 6 months thereafter. Passed unanimously.
8. Ford will continue to look at bore measurements using the EMDO device. The labs are still requested to send there blocks after calibration testing. Ford has only received 3 blocks since May. PDI is currently in the development stage of a portable device that may be useable for this purpose.
9. This group is requesting a teleconference of the Task Force to address how future Sequence VG hardware will be supplied to the testing industry. Barry is chairman of this group and will coordinate this.
10. The following topic was briefly discussed and tabled at this time because Barry had to leave the meeting. The O&H panel will follow through with this motion via a teleconference sometime next week. Besides Ford Power Products, the new Romeo Sequence VG test engine, part number OG-804-AA, can also be procured from AER. Approval of this motion does not preclude Ford Power Products as a distributor, but merely offers another source for the exact same test engine. The quantities being purchased are left to the various testing laboratories, as in the case of the current request from Ford Power Products.
11. This group will also discuss proposed VG prove-out matrix designs during the conference call next week. The parameters are:  
2 or 3 oils, 2-4 bore sizes, number of test labs, number of test stands, number of tests per lab. Two bore sizes (.125 and .500mm) is what the group is liking right now. They also like only two oils right now. A third oil will increase the number of tests required. The first oil from each lab should be 1006-2 to make sure things are on target initially. It will take about 6 weeks to acquire the piston and ring sizes. The matrix may start around November 1. The test labs should also use the same ring gaps for at least the start of this matrix work.

September 17, 2002 O&H Meeting

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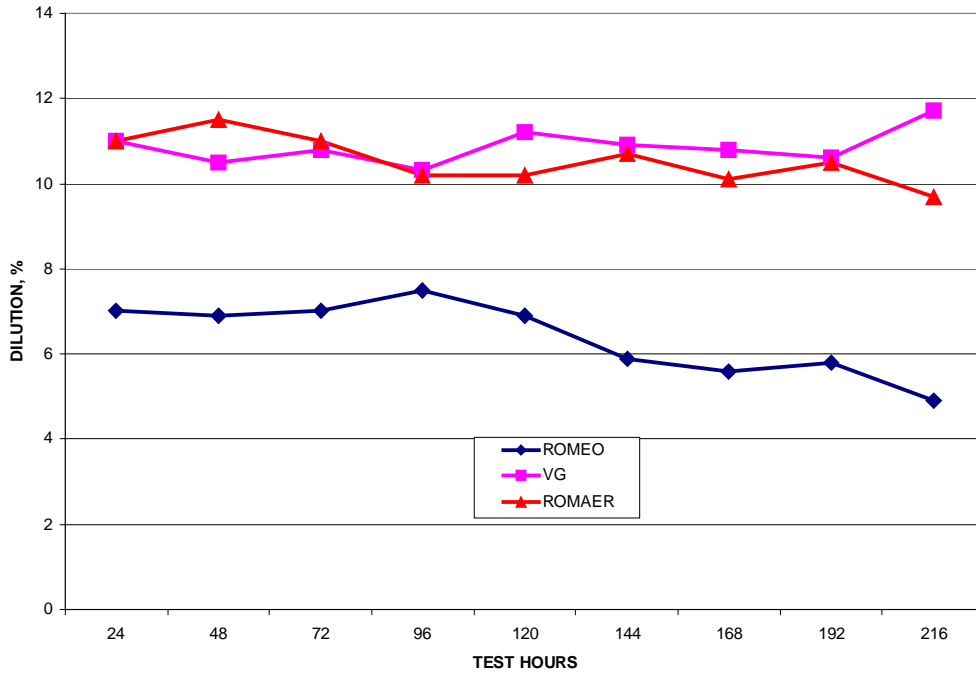
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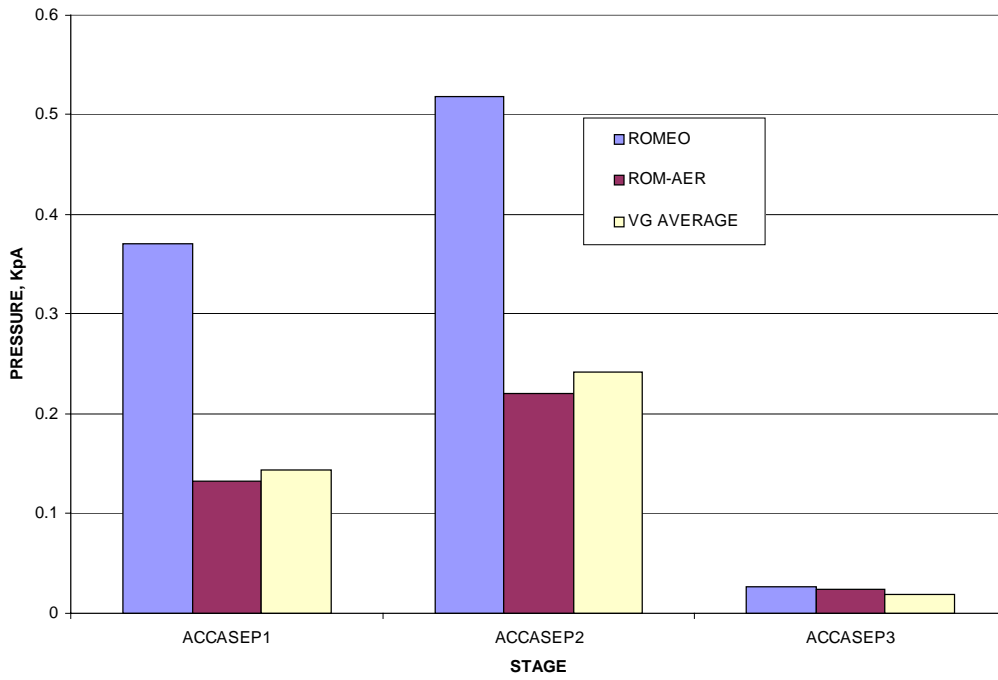
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FUEL DILUTION, %



CRANKCASE PRESSURE BY STAGE





### OIL PRESSURE BY STAGE

