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Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

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May 24, 2004

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Unapproved Minutes of the May 11, 2004
Sequence VG Surveillance Panel Meeting
Held in Detroit, Michigan

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Chairman Farnsworth called the meeting to order at 2:38pm. The Agenda was passed out and reviewed. *{The Agenda is shown in Attachment 1.}*

Motion & Action Item Recorder – Bill Buscher is the Motion & Action Item recorder for this meeting.

Membership Changes – John Moffa of Castrol is no longer a member. A replacement has not been named at this time. Mark Sutherland replaces Alfredo Montez as the Oronite member. *{A Membership list, which was circulated at the meeting, is shown in Attachment 2.}*

Approval of 6/11/03 Meeting Minutes – The minutes for the 6/11/03 meeting were approved unanimously and without comment.

Review of Action Items – The action items from the last meeting were reviewed. *{A copy of those Action Items is shown in attachment 3.}*

Sequence VG Surveillance Panel Meeting
May 11, 2004; 2:30pm to 5:00pm
Detroit, Michigan

VG Bore Wear Study – Mike Riley presented his report on the Sequence VG Bore Wear Study. *{A copy of his presentation is shown in attachment 4.}* The study was conducted on 13 engine blocks supplied by the test laboratories, using two different pieces of metrology equipment. The two instruments used in the study were briefly reviewed, along with the pros and cons of both instruments relative to this study. The study found negligible differences in bore wear on reference oils 1009, 1006, and 925 using the PAT Incometer instrument. The process of bore wear measurement was discussed amongst the group, particularly in comparison to the processes used in Diesel liner wear. Ford will continue to investigate this issue, but at this time no Surveillance Panel action is required.

Roller Pin and Ring Wear Measurement Status – Elimination of these measurements is a pending item of business before the Surveillance Panel. These items are “rate and report” parameters in the test and also in the current performance category for candidate oils. An analysis of the candidate oil data in the RSI database proved to be unsatisfactory to some of the members of the Surveillance Panel. There was some discussion of asking RSI to perform another analysis of the data since the raw candidate data is not available to the panel membership. Chairman Farnsworth will again ask RSI to perform another analysis on this data for the panel to review. This item was tabled until the next Surveillance Panel meeting.

Hardware Items – The panel then discussed several hardware issues.

Spark Plugs – The latest engine kits came with AGSF32FM spark plugs, while the industry is currently using AWSF32PP spark plugs. Bill Buscher had an example of each type for the panel to review.

Motion (Bill Buscher/Dave Glaenzer) Use either spark plug in Sequence VG testing. The motion passed 8-0-1.

Piston Chamfers – Dan Worcester presented some information on piston chamfers versus ring gap and how it affects blowby results. *{His presentation is shown in Attachment 5.}* After much discussion, the consensus seemed to be that the laboratories have learned how to deal with the current hardware and that reworking the current hardware has more potential pitfalls than benefits at this time. On future hardware this issue will be reviewed, but at this time the panel will take no action.

Piston Skirt Cleaning Before Test – Dan Worcester presented some information about discoloration over time of the tin-plating on the piston skirt. In the current Sequence VG test, cleaning of pistons is not allowed.

Motion (Dan Worcester/Jerry Brys) Examine the piston skirts prior to engine assembly for discoloration. If the piston rates below a 10.0 on the CRC varnish rating scale (CRC Manual 20), clean the pistons with a Scotch Brite 7445 pad. Reject any pistons on which the discoloration cannot be removed. Place a note in the test report that the pistons were cleaned prior to assembly. The motion passed unanimously 9-0-0.

Wiring Harness – Dwight Bowden commented that the engine harness is no longer available through the dealer network and that OH Technologies, Inc. will make a replacement harness available.

Review of Quality Index Limits – Dan Worcester made a brief presentation on QI limits in the Sequence VG test and how they compare to the U&L values used in other test areas. Rich Grundza then presented a summary of the QI deviations recorded to date in industry as well as the changes to QI U&L values since the introduction of QI monitoring. He also presented a review of a few tests with QI results outside the current limits and new U&L values calculated from those two tests.

Sequence VG Surveillance Panel Meeting
May 11, 2004; 2:30pm to 5:00pm
Detroit, Michigan

Motion (Dan Worcester/Dave Glaenzer) Change the MAP and EBP U&L values to ± 0.400 and ± 0.17 of the target value, respectively, effective 5/12/04. The motion passed 9-0-0.

Fuel Supplier Report – Jim Carter presented the fuel supplier report. *{A copy of his report is shown in attachment 6.}* Haltermann has 166,000 gallons of saleable fuel on hand, which is approximately a 10-month inventory. Rich Grundza will lead a small group to develop a plan for the blending of another fuel batch. Mr. Grundza will schedule a conference call in the near future on this topic.

GF-4 Category Reference Oil – The Sequence VG Surveillance Panel does not desire a GF-4 Category Reference Oil at this time.

Rater Calibration System Status Report – Rich Grundza made a brief presentation on the results of latest Rating Workshop. The raters recommended a revised definition of the term “debris” to mean all matter not immediately recognizable as byproducts of the combustion process when rating the oil screen. The sludge interpolation requirement, listed in 13.2.2.1, was discussed during the workshop, as several raters were not aware of the requirement as defined in the procedure. A review of the current definition listed in the procedure showed that the new definition is no different than the current one, making a change unnecessary.

Scope and Objectives – The Scope & Objectives were reviewed. *{A copy of the Scope and Objectives is shown in attachment 7.}*

{The Motions & Action Items from this meeting, as recorded by Mr. Buscher, is shown in Attachment 8.}

The next meeting is at the call of the chairman.

The meeting was adjourned at 5:04pm.

Attachment	<u>1</u>
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Reference	<u> </u>

Agenda

Sequence VG Surveillance Panel

May 11, 2004

2:30PM – 5:00PM or later

Detroit, Michigan

1. Chairman comments
2. Attendance sign-in sheet distribution
3. Membership changes
4. Motion and Action recorders
5. Approval of minutes for June 11, 2003 All
6. Review action Items from last meeting G. Farnsworth
7. Hardware Items
 - Spark plugs AWSF32PP (current) AGSF32FM (Kit) All
 - Piston chamfers / ring gaping versus piston size All
 - Piston skirt cleaning before test Dan Worchester
 - Wiring Harness Dwight Bowden
 - Other issues? All
8. Review of Qi limits Dan Worchester
9. Fuel Supply report James Carter
 - Projected life of current batch
 - Status of blend components A & B for next batch
10. Need for GF-4 Category reference oil G. Farnsworth
11. Status of Rater Calibration System R. Grundza

12. Learnings from CRC rater workshop?

13 . Review Scope & Objectives

14. Old Business

15. New Business






16. Adjourn

Attachment	<u>1</u>
Page	<u>2</u>
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All

Attachment 2
1
 Reference _____


MEMBERSHIP
 ASTM SEQUENCE VG SURVEILLANCE PANEL

Name	Company-Address-Phone-Fax- Email	Signature	Voting Member
Araiazo, Beto ARAIZA	Test Engineering, Inc 12718 Cimarron Path San Antonio, TX 78249 Phone: 210-877-0222 Fax No: 210-690-1959 Email: baraiza@tei-net.com		Yes
Bendele, Larry	Southwest Research Institute P.O. Drawer 28510 San Antonio, TX 78228-0510 Phone: 210-522-2824 Fax No: 210-684-7523 Email: lbendele@swri.edu		No
Bowden, Dwight	OH Technologies, Inc. 9300 Progress Parkway P.O. Box 5039 Mentor, OH 44061-5039 Phone: 440-354-7007 Fax: 440-354-7080 Email dhbowden@ohtech.com		Yes
Brys, Jerome	The Lubrizol Corporation 29400 Lakeland Boulevard Wickliffe, OH 44092 Phone: 440-347-2631 Fax: 440-347-4096 Email: jabs@lubrizol.com		Yes
Buck, Ron	Test Engineering, Inc 12718 Cimarron Path San Antonio, TX 78249 Phone: 210-877-0221 Fax No: 210-690-1959 Email: rbuck@tei-net.com		No
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Buscher, William A	Southwest Research Institute P.O. Drawer 28510 San Antonio, TX 78228-0510 Phone: 210-522-6802 Fax No: 210-684-7523 Email: wbuscher@swri.edu		Yes
Carter, James	Dow 2296 Hulett Road Okemo MI 48864		Yes

Attachment 2
 Page 2
 Reference _____

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Caudill, Timothy	Valvoline 22 nd and Front Streets Ashland KY 41101 Phone: 606-329-5708 <i>1960 X5708</i> Fax: 606-329-3009 Email: tcaudill@ashland.com	<i>Timothy Caudill</i>	Yes
Clark, Sid	GM Powertrain Mail Code 480-106-160 30500 Mound Road Warren, MI 48090-9055 Phone: 586-986-1929 Fax: 586-9986-2094 Email: Sidney.l.clark@gm.com		Yes
Farber, Frank	ASTM Test Monitoring Center 6555 Penn Avenue Pittsburgh, PA 15206 Phone: 412-365-1030 Fax: 412-365-1045 Email: fmf@astmtmc.cmu.edu		No
Farnsworth, Gordon	Infineum USA L.P. 1900 East Linden Avenue P.O. Box 735 Linden NJ 07036-0536 Phone: 908-474-3351 <i>570-934-2776</i> Fax: 908-474-3637 Email: Gordon.Farnsworth@infineum.com	<i>GF</i>	Yes
Florkowski, Dennis	DaimlerChrysler Corporation CIMS 482-00-13 800 Chrysler Drive East Auburn Hills, MI 48326-2757 Phone: 248-576-7477 Fax: 248-576-7490 Email: fd11@daimlerchrysler.com		Yes
Glaenger, Dave	Ethyl Corporation 500 Spring Street Richmond VA 23218-2158 Phone: 804-788-5214 Fax: 804-788-6358 Email: dave_glaenger@ethyl.com	<i>D. Glaenger</i>	Yes
Gomez, Redescal	Intevep S.A. Los Teques, Edo Miranda Adpo 76343 Caracas 1070-A Venezuela Phone: 9-011-582-9086754 Fax: 9-011-582-9087723		

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Lopez, Al	PerkinElmer Fluid Sciences 5404 Bandera Road San Antonio, TX 78238 Phone: 210-647-9465 Fax: 210-523-4661 Email: al.lopez@perkinelmer.com		
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Montez, Alirado <i>Sutherland, Mark</i> <i>Delete</i>	Chevron Oronite Company, LLC 4502 Centerview Drive Suite 210 San Antonio, TX 78228 Phone: 210-731-5695-867-8387 Fax: 210-731-5699 Email: amontez@chevrontexaco.com	<i>[Handwritten Signature]</i>	Yes
Riley, Mike	Ford Motor Company 21500 Oakwood Boulevard POEE Building, Mail Drop #44 Dearborn, MI 48124-4091 Phone: 313-396-3054 Fax: 313-845-3169 Email: mriley2@ford.com	<i>[Handwritten Signature: M. J. Riley]</i>	Yes
Rumford, Robert	Dow 1201 Sheldon Road P.O. box 0429 Channelview TX 77530-0429 Phone: 832-376-2213 Fax: 281-457-1469 Email: rhrumford@dow.com		No
Sutherland, Mark	Chevron Oronite Company, LLC 4502 Centerview Drive		Yes 

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Page	<u>5</u>
Reference	<u> </u>

Action Items Review

Attachment	<u>3</u>
Page	<u>1</u>
Reference	<u> </u>

Old Items(March, 2003meeting):

- 1.) Evaluate new Ford bore measurement procedure to determine need. Mike Riley
- 2.) Roller pin and ring wear measurements will cease at the May 2003 SP meeting, unless the data from references and RSI convince this panel of their value. Still pending

New Items (June, 2003 meeting):

- 1.) Hold a rebuild workshop at AER in July with an extra day for documenting all the rebuild details. Done
- 2.) Ford should have the “final” solicitation letter regarding all the Romeo hardware by next week (June 19, 2003). Done

Sequence VG Report

ASTM Sequence VG Surveillance Panel Meeting

Sheraton Hotel, Romulus, MI

May 11, 2004

Mike Riley

Fuels and Lubricants Engineering

Attachment	4
Page	1
Reference	



Background VG Bore Wear Study

- Ford investigated VG bore wear measurements to determine a more precise result than the average radial bore method previously used.
- The Hommelwerke (HW) profilometer and PAT Incometer systems were used.
 - HW evaluates wear at one location from top of cylinder down 48 mm.
 - PAT evaluates wear at 8 locations every 45 degrees from top of cylinder down 25 mm.
- The approximate costs are \$50,000 for HW and \$150,000 for PAT.

Attachment	4
Page	2
Reference	



VG Bore Wear Study

- Ford completed measurements on 13 blocks supplied by test labs.
- The reference oils tested were:

	1009	1006	925-3
Hommelwerke	5	3	1
PAT Incometer	8	4	1

Thanks to Labs for Support

Attachment	<u>4</u>
Page	<u>3</u>
Reference	<u> </u>



VG Bore Wear Study Hommelwerke Instrument

- Designed to evaluate several surface finish parameters.
- Bore wear was determined with "Waviness Depth" parameter – Maximum peak to valley height of the filtered waviness profile over the 48 mm evaluation length.
- One bore wear measurement made for each cylinder.
- Misalignment with bore centerline results in significant error of bore wear measurement.

Attachment	4
Page	4
Reference	



VG Bore Wear Study PAT Incometer Instrument

- PAT Incometer (Inner Contour Meter) determines roundness and cylindricity of bores with $\pm 30\%$ accuracy.
- Bore wear measured using computer controlled incometer takes 8 measurements per cylinder to define bore wear better.
- Incometer decreases operator variation.
- Misalignment of home position to front of block causes some variation, especially with different operators.

Attachment	4
Page	5
Reference	



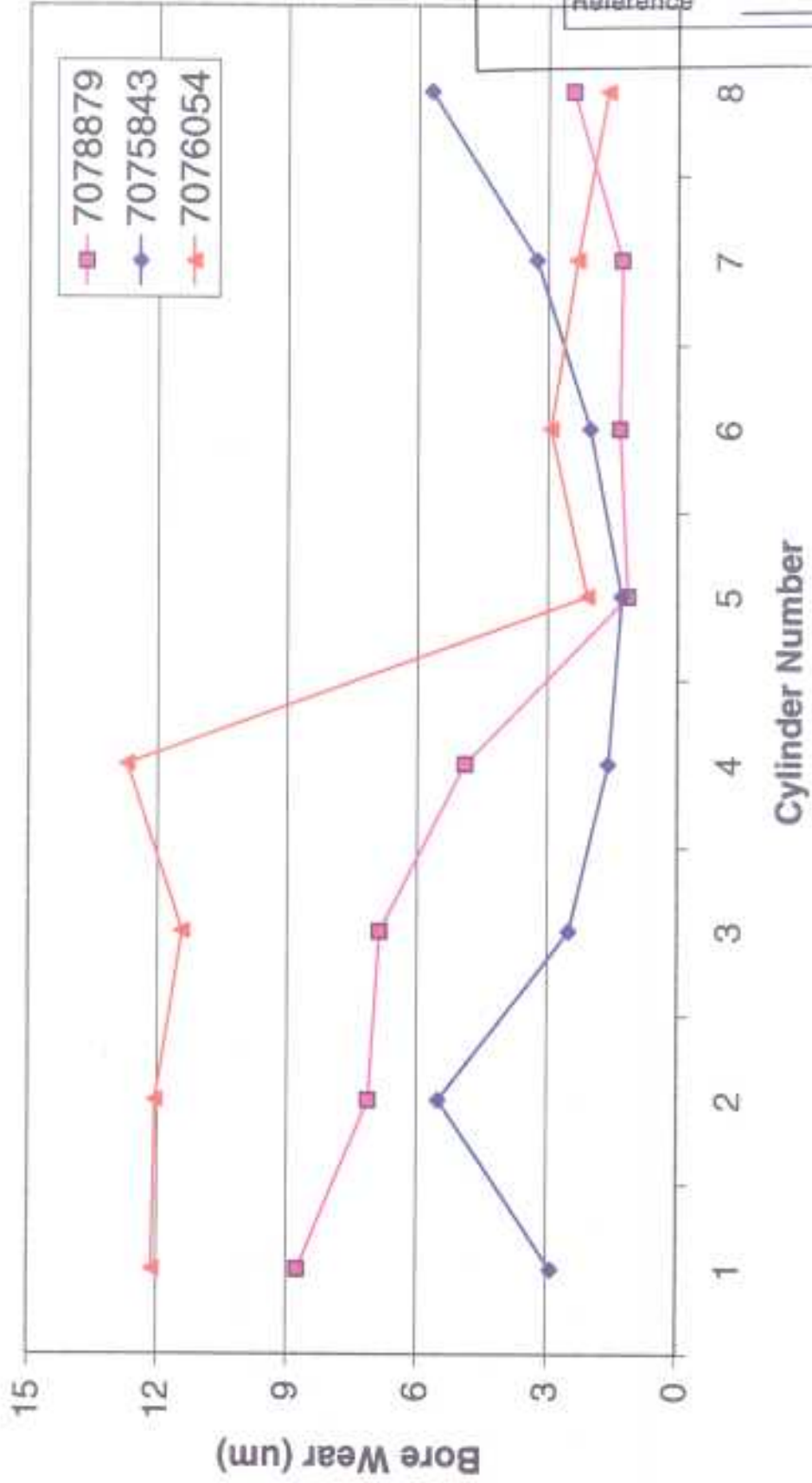
Sequence VG Report Conclusions

- PAT Incometer provided better bore wear measurements than the Hommelwerke.
- A profilometer instrument similar to the Hommelwerke should provide acceptable bore wear measurements by making surface wear evaluation on a line parallel to bore centerline.
- PAT Incometer measurements indicate there are negligible differences in bore wear with the 1009, 1006 and 925 reference oils during the Sequence VG test.

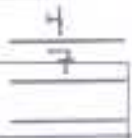
Attachment	4
Page	6
Reference	



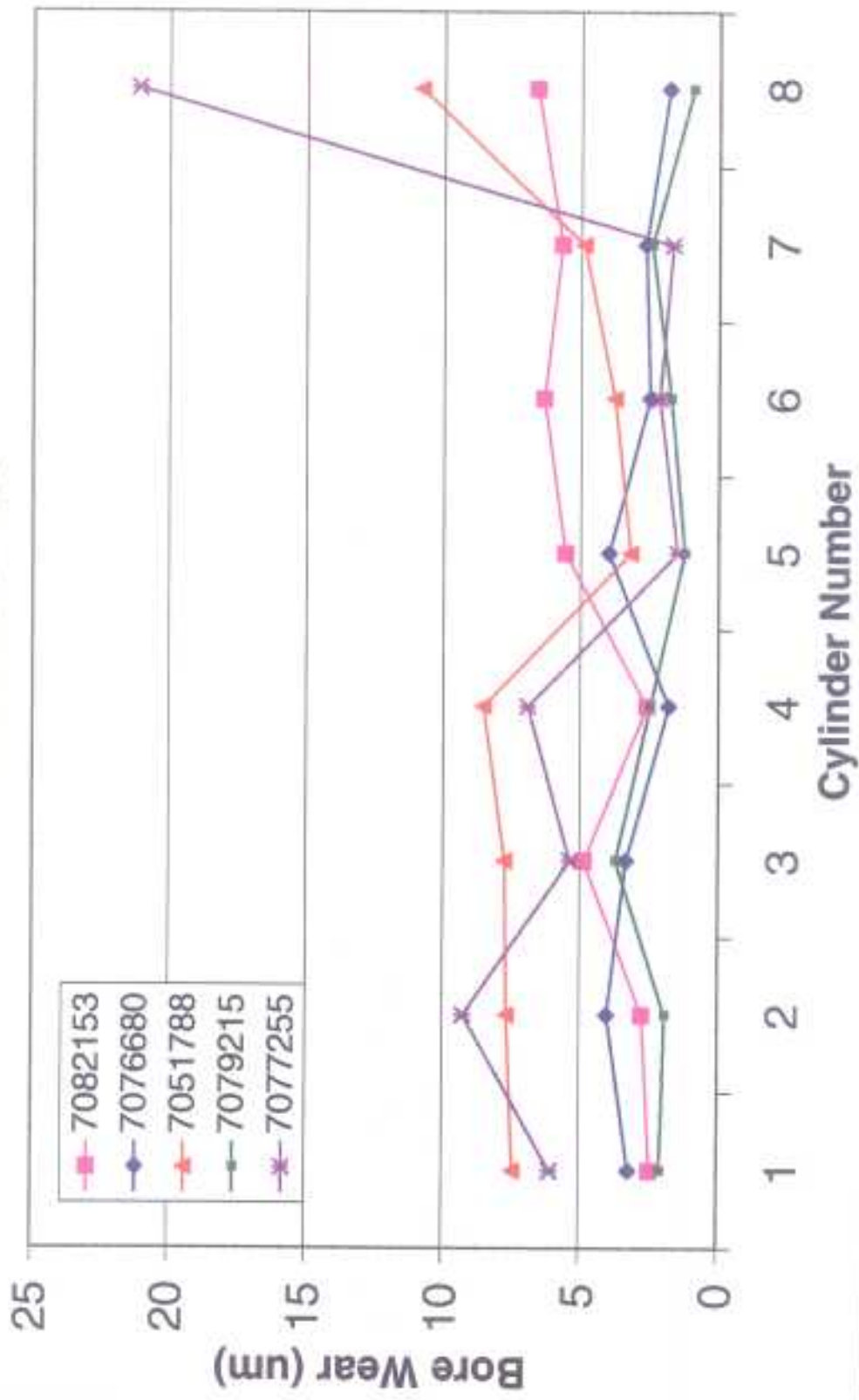
Ford Hommelwerke Bore Wear Measurements of VG 4.6L Engine Reference Oil 1006



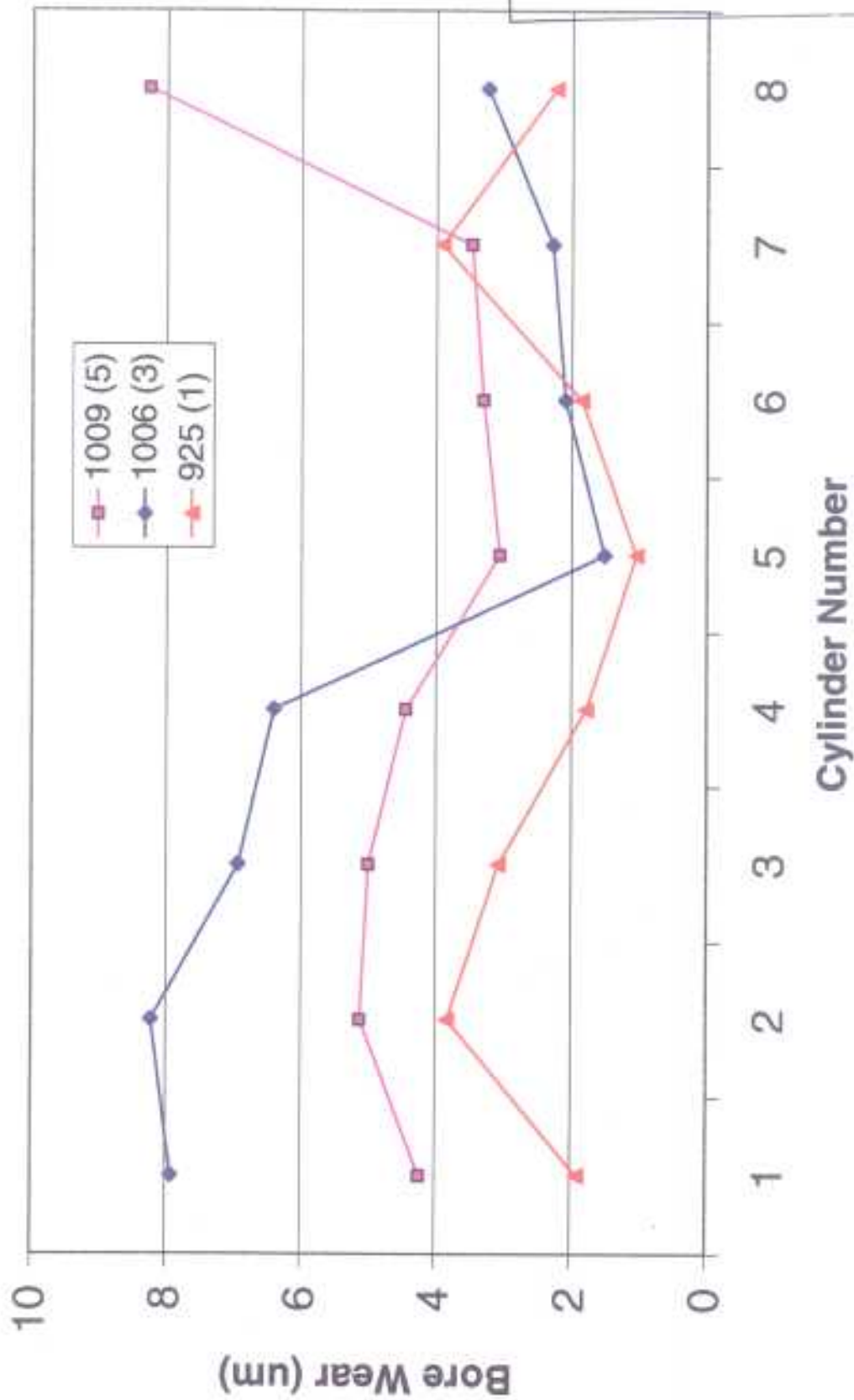
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Reference



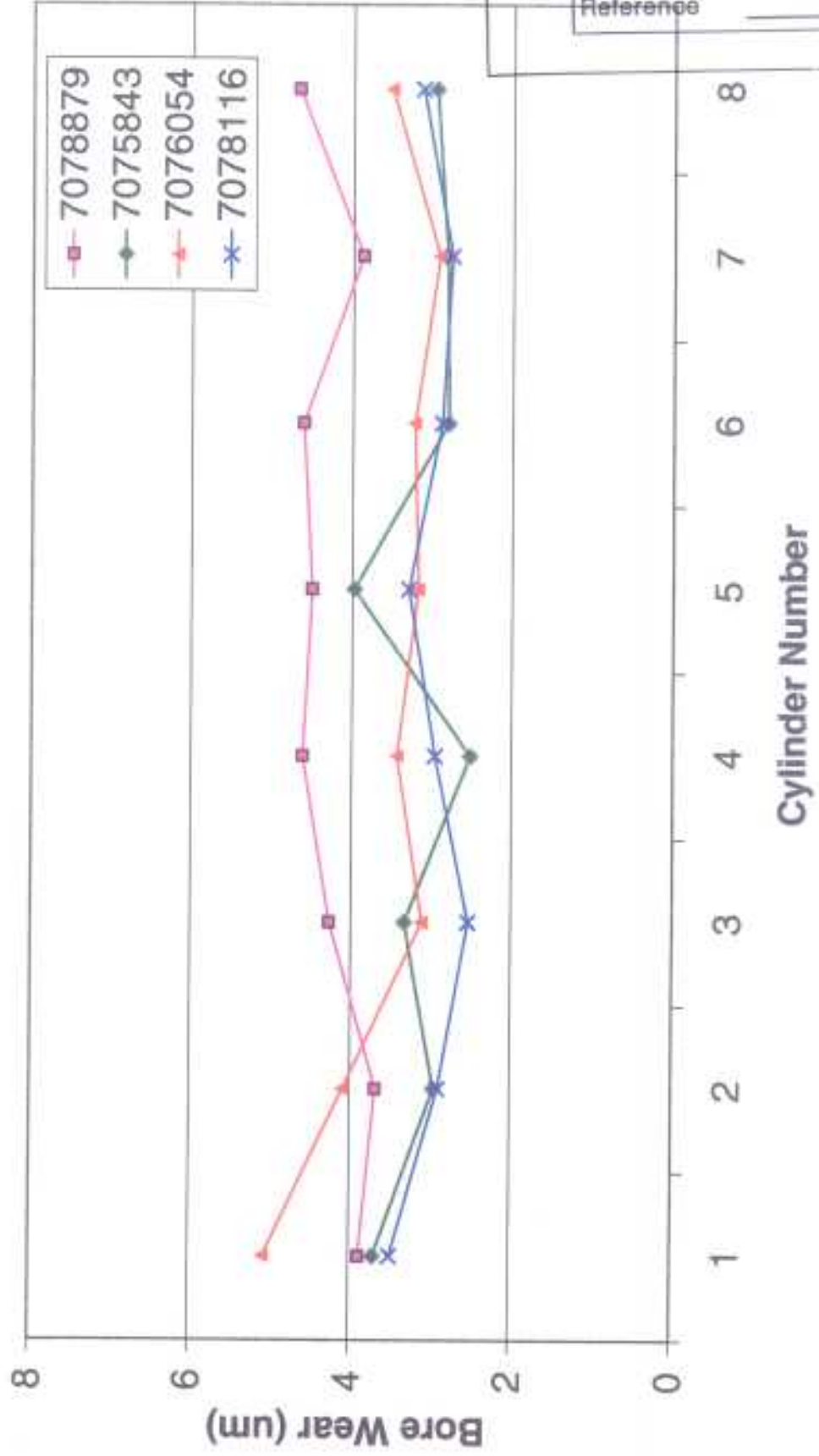
**Ford Hommelwerke Bore Wear Measurements of VG 4.6L Engine
Reference Oil 1009**



Ford Hommelwerke Bore Wear Measurements of VG 4.6L Engine

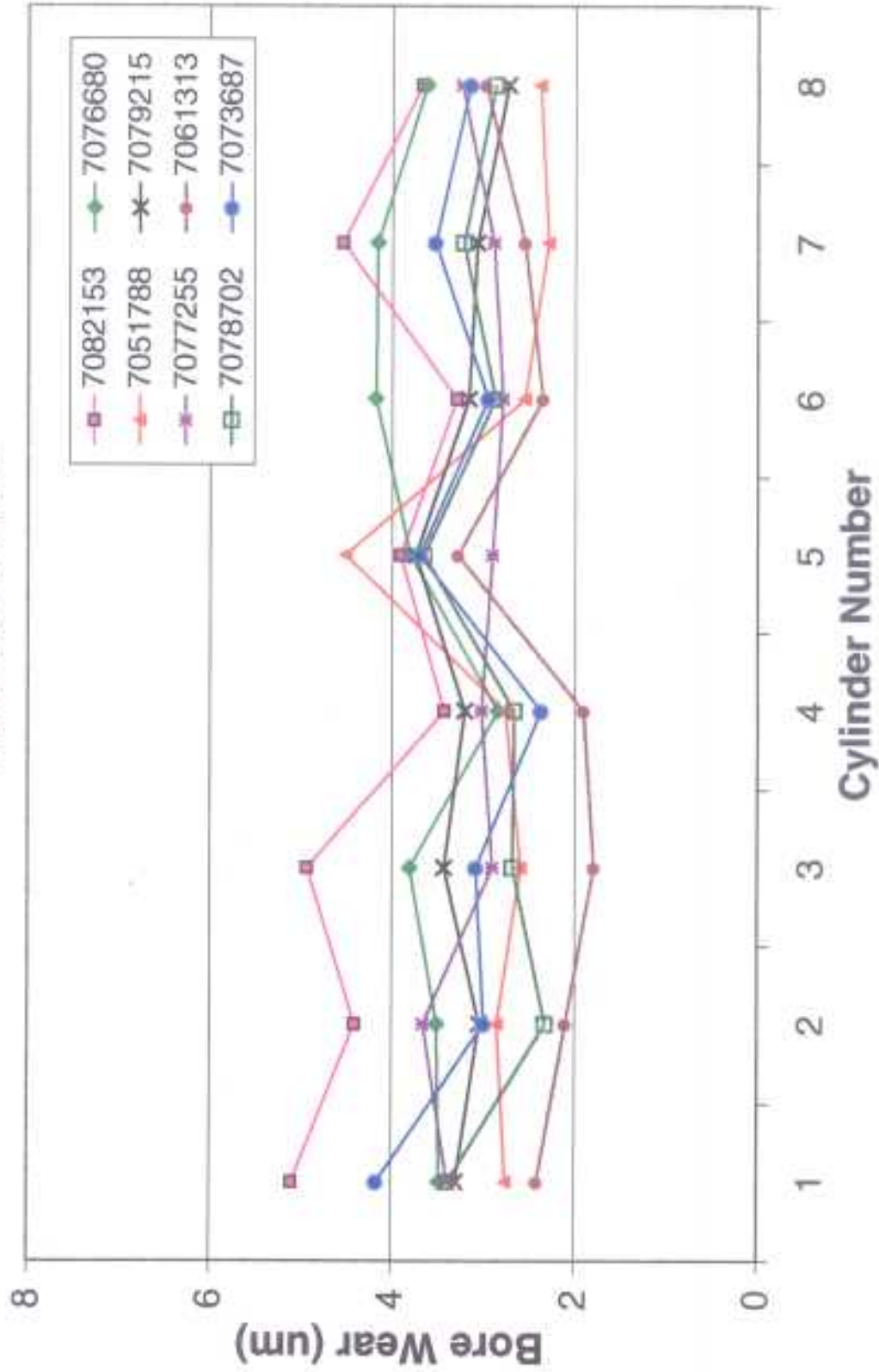





Ford PAT Bore Wear Measurements of VG 4.6L Engine Reference Oil 1006



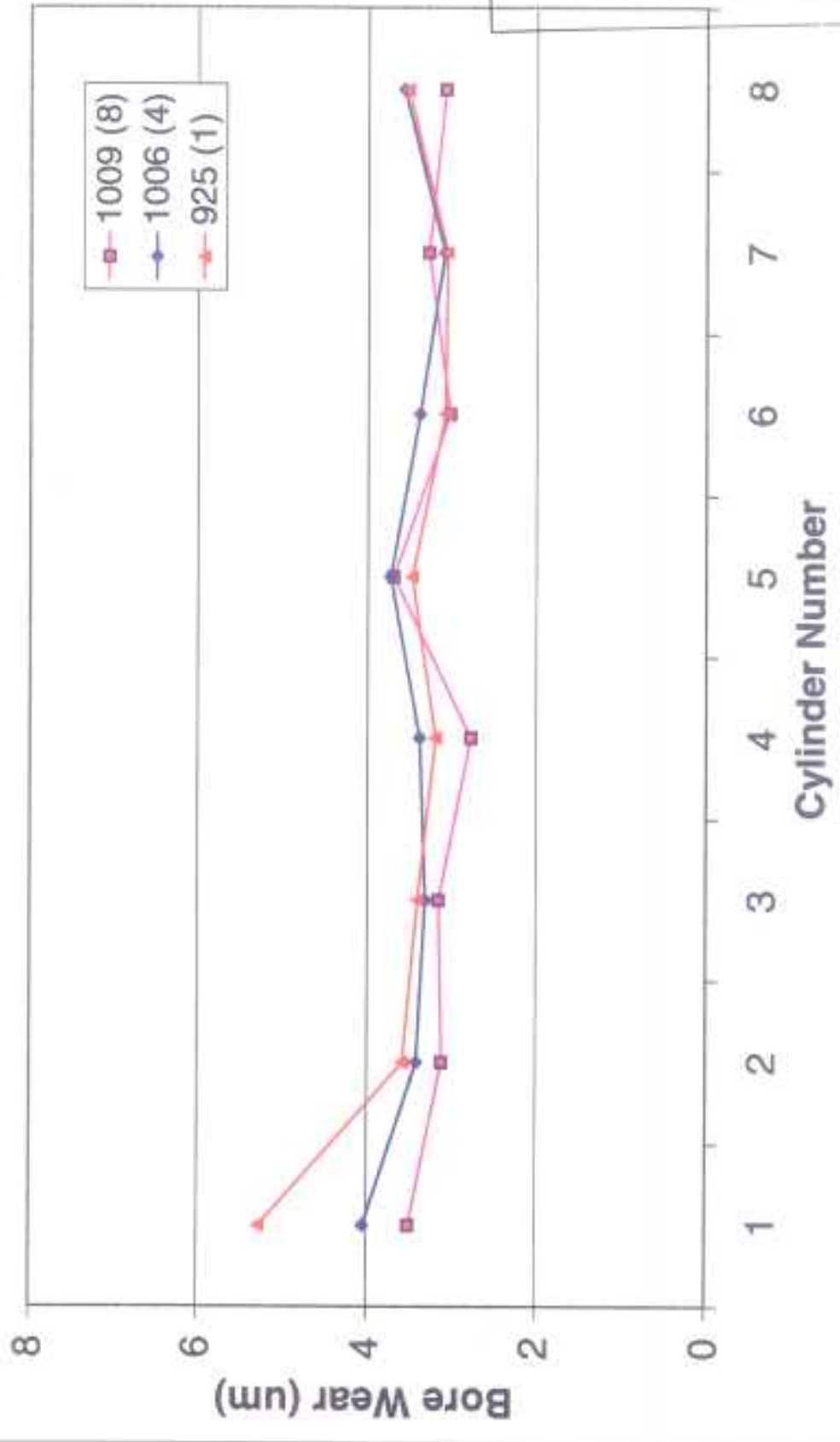
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- 7075843
- 7076054
- 7078116

Ford PAT Bore Wear Measurements of VG 4.6L Engine Reference Oil 1009

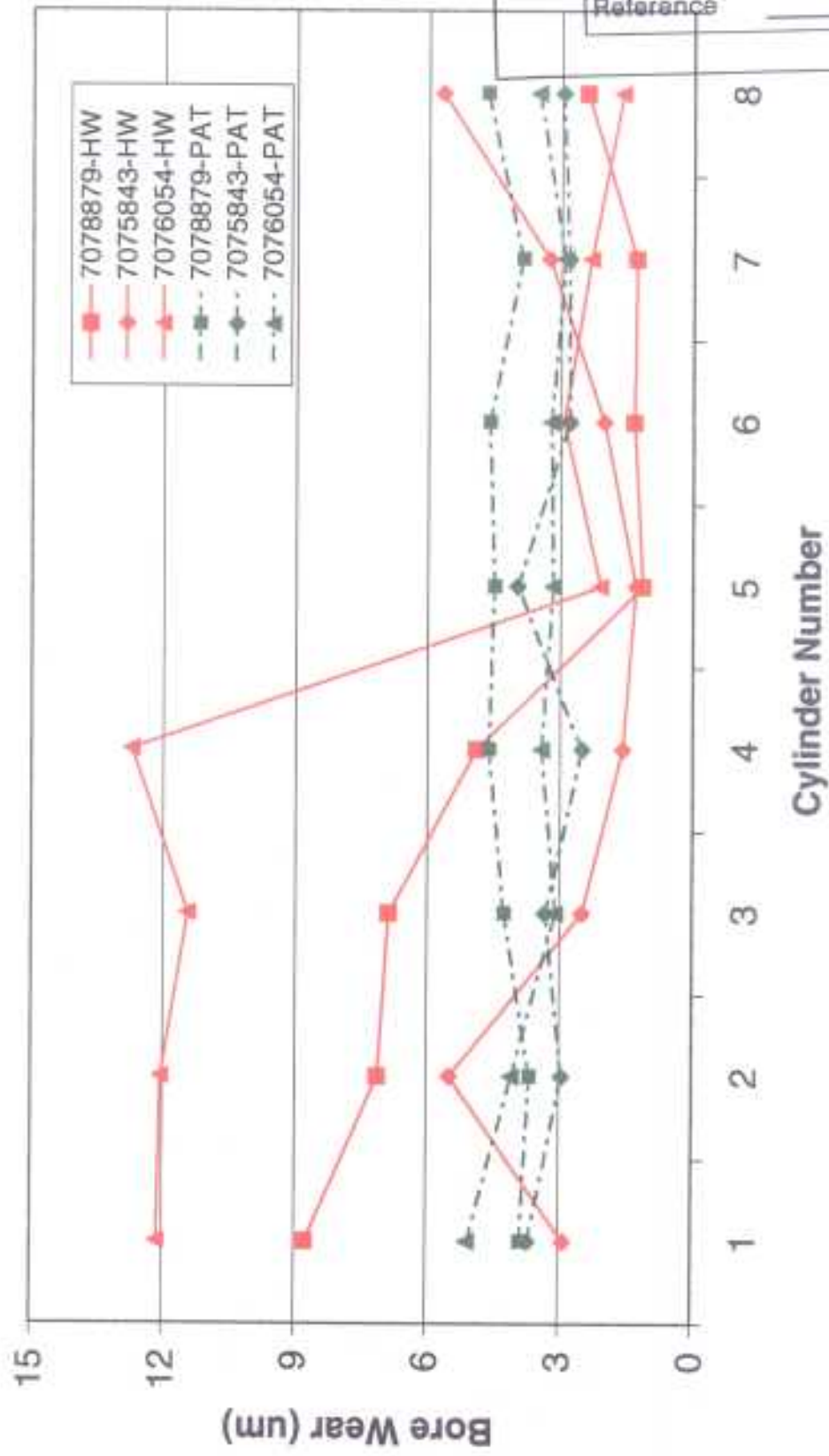


Attachment 
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 Reference 

Ford PAT Bore Wear Measurements of VG 4.6L Engine

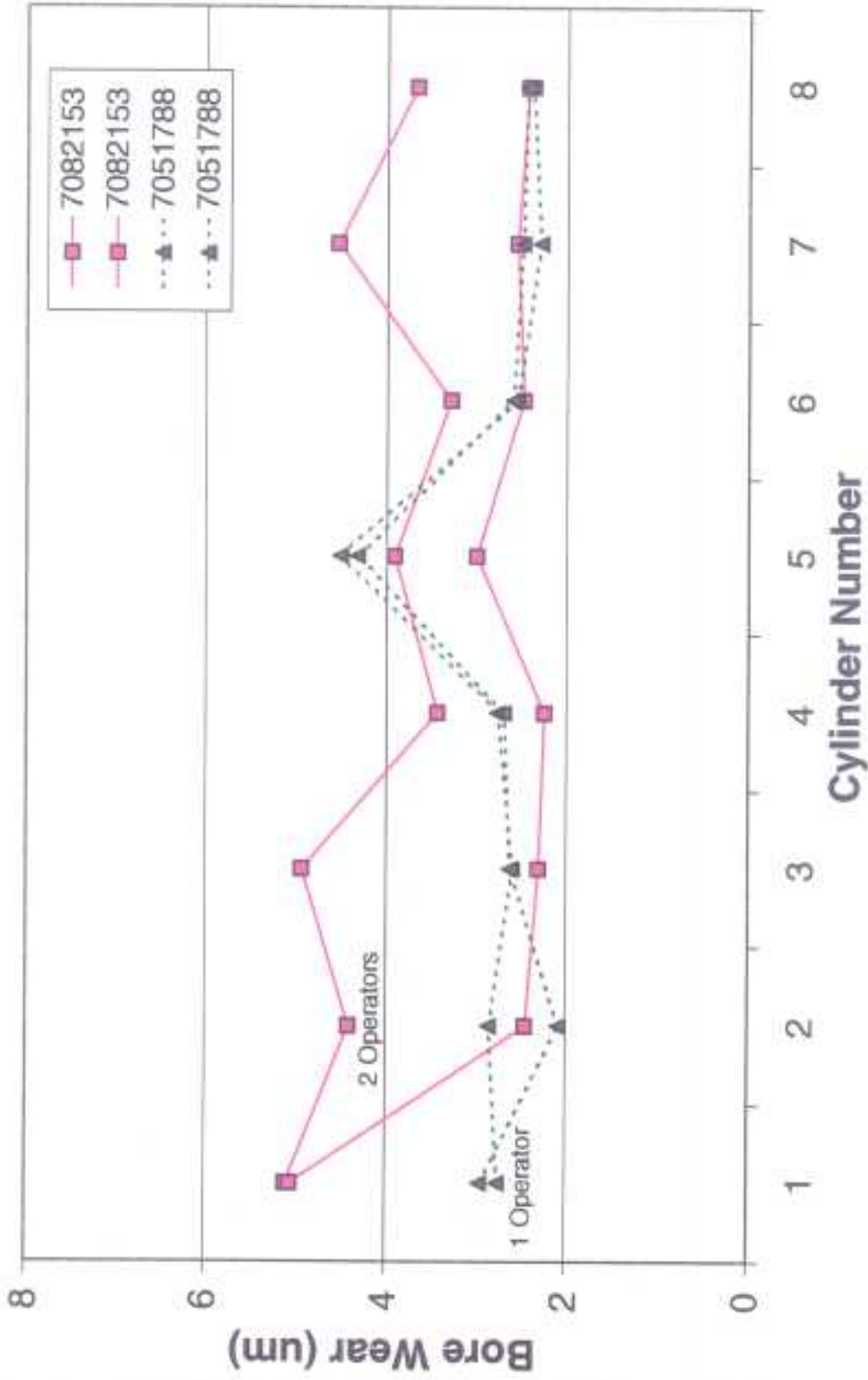


VG 4.6L Engine Bore Wear Measurements
Ford Hommelwerke (HW) and PAT Instruments
Reference Oil 1006



Attachment
 Page
 Reference

**Duplicate Bore Wear Evaluations
Ford PAT Measurements of VG 4.6L Engine
Reference Oil 1009**



INSPECTION REPORT

10.08.2003

08:48

HOMMELWERKE
Turbo Roughness V3.16
Measuring conditions

Pick-up type: TK300
Measuring range: 80 µm
Assessment length: 48.00 mm
Speed: 0.15 mm/s
Lc (Cut Off): 8.000 mm
Filter: M1 DIN4777
Zero Line Pmr: 0.00 %
Zero Line Rmr: 0.00 %

FORD/WHITT/EMDO
PART NUMBER
ENGINE NUMBER
SERIAL NUMBER
CYLINDER BORES
LOCATIONS
REQUESTOR
OPERATOR

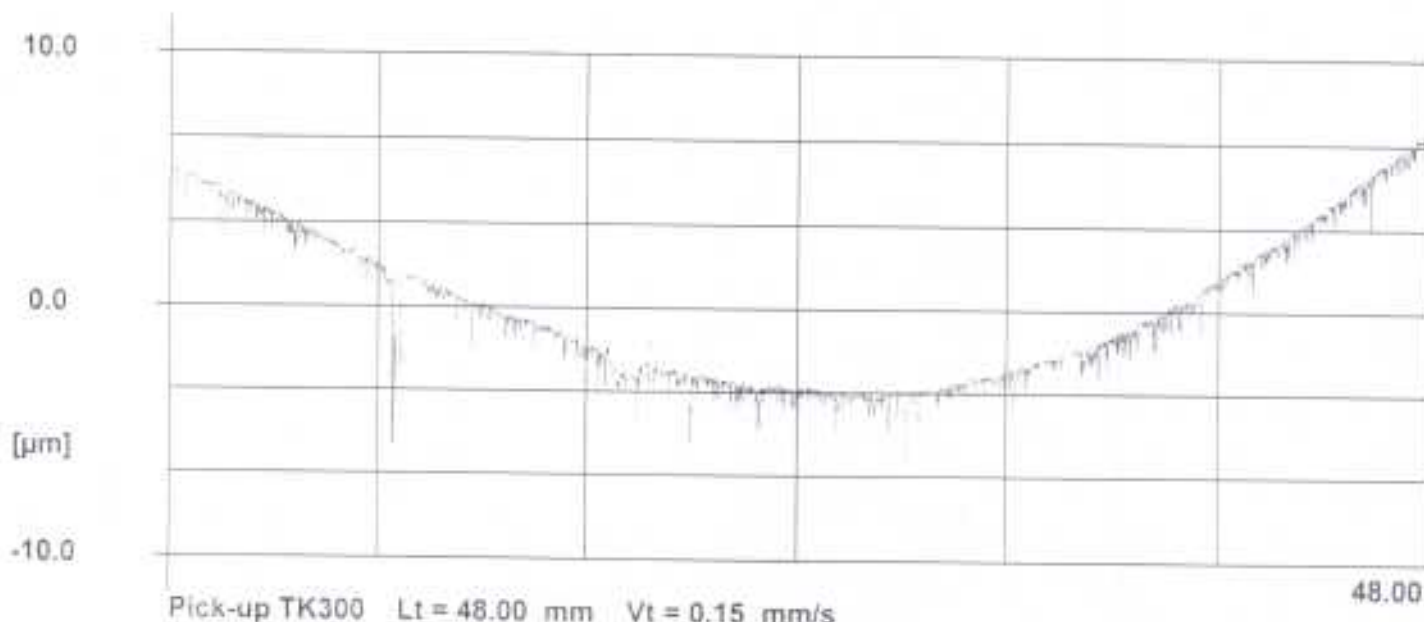
Cylinder Bore Surf. Finish
4.6L PRODUCTION
W0425862

#2	
Attachment	4
Page	15
Reference	R1 10-08-03

	Act.	Nom.	LT	UT	<>
Ra	0.22 µm	0.28	0.15	0.40	0.00 µm
Vo(Mr2) 0.001*	<u>10.46 mm³/cm²</u>	5.00	0.00	10.00	0.46 mm ³ /cm ²

Important Note: CV µm³/µm² = Vo value divided by 100 or just move 2 decimal points of the Vo value to the left.
CV es-spec is 0.1 µm³/µm²
(This program/software does not have the CV profile)

P- Profile leveled Lc/Ls = 300



REFERENCE ONLY

Pt	15.27 µm	Rmax	9.51 µm
Rq	0.44 µm	RPc	82 /cm
Rsk	-7.21	RSm	0.121 mm
RzISO	4.44 µm	Rpm/R3z	0.193
R3z	2.59 µm	Rku	100.00
Rt	10.31 µm	Rpk*	0.91 µm
Rpm	0.50 µm	Rpk	0.17 µm
Rz	4.11 µm	Rk	0.36 µm
Rp3z	0.193	Rvk*	9.09 µm
R3zm	5.35 µm	Rvk	0.84 µm
Rp	1.27 µm	Mr1	4.6 %
Wt	7.45 µm	Mr2	75.2 %

INSPECTION REPORT

10.08.2003

09:19

HOMMELWERKE

Turbo Roughness V3.16

Measuring conditions:

Pick-up type

Measuring range

Assessment length

Speed

Lc (Cut Off)

Filter

Zero Line Pmr:

Zero Line Rmr:

TK300

80 µm

48.00 mm

0.15 mm/s

8.000 mm

M1 DIN4777

0.00 %

0.00 %

FORD/WHITT/EMDO

PART NUMBER

ENGINE NUMBER

SERIAL NUMBER

CYLINDER BORES

LOCATIONS

REQUESTOR

OPERATOR

Cylinder Bore Surf. Finish

4.6L PRODUCTION

W0425862

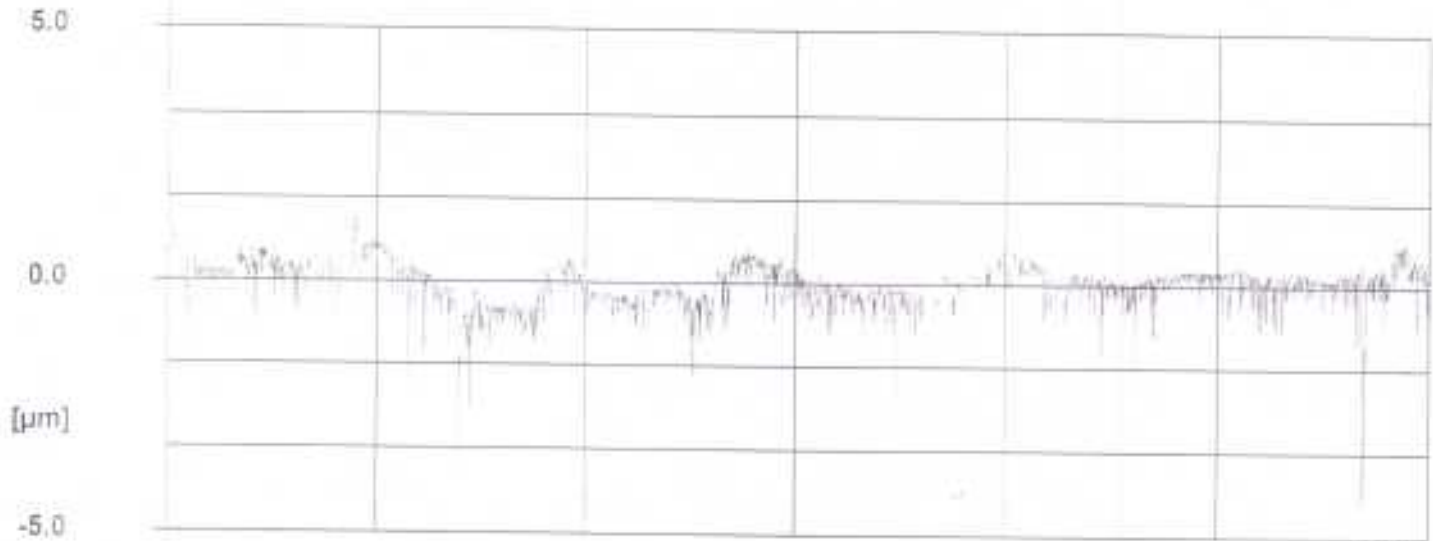
# 2A	4
Attachment	4
Page	16
Reference	M. RILEY
	USEMELR1 10.08.03

	Act.	Nom.	LT	UT	<>
Ra	0.24 µm	0.28	0.15	0.40	0.00 µm
Vo(Mr2) 0.001*	6.17 mm ³ /cm ²	5.00	0.00	10.00	0.00 mm ³ /cm ²

Important Note: CV µm³/µm² = Vo value divided by 100 or just move 2 decimal points of the Vo value to the left.
CV as-spec is 0.1 µm³/µm²

(This program/software does not have the CV profile)

Profile leveled Lc/Ls = 300



Pick-up TK300 Lt = 48.00 mm Vt = 0.15 mm/s

48.00

REFERENCE ONLY

Pz	5.56 µm	Rmax	4.37 µm
Rq	0.34 µm	RPc	69 /cm
Rsk	-1.62	RSm	0.143 mm
RzISO	3.08 µm	Rpm/R3z	0.340
R3z	1.92 µm	Rku	10.225
Rt	4.37 µm	Rpk*	0.63 µm
Rpm	0.55 µm	Rpk	0.32 µm
Rz	2.72 µm	Rk	0.57 µm
Rp3z	0.340	Rvk*	3.25 µm
R3zm	2.88 µm	Rvk	0.66 µm
Rp	3.27 µm	Mr1	10.6 %
Wt	0.35 µm	Mr2	81.3 %

FORD EMDO - BORE WEAR INSPECTION

BORE NUMBER	0°	45°	90°	135°	180°	225°	270°	315°
1	2.2µm	6.04µm	2.76µm	3.02µm	4.67µm	3.42µm	3.07µm	1.94µm
2	2.9µm	2.53µm	3.65µm	3.19µm	3.82µm	3.33µm	3.24µm	6.31µm
3	2.55µm	2.59µm	2.64µm	3.16µm	4.32µm	2.94µm	2.85µm	2.18µm
4	2.27µm	2.58µm	3.12µm	3.87µm	4.07µm	3.31µm	2.98µm	1.93µm
5	3.22µm	2.54µm	5.77µm	2.6µm	1.74µm	2.27µm	2.67µm	2.42µm
6	3.57µm	3.41µm	2.79µm	2.22µm	2.53µm	2.27µm	2.95µm	2.75µm
7	3.18µm	2.99µm	2.96µm	2.18µm	2.52µm	3.01µm	3.51µm	2.74µm
8	3.57µm	2.77µm	2.46µm	2.78µm	3.1µm	3.6µm	4.1µm	3.51µm

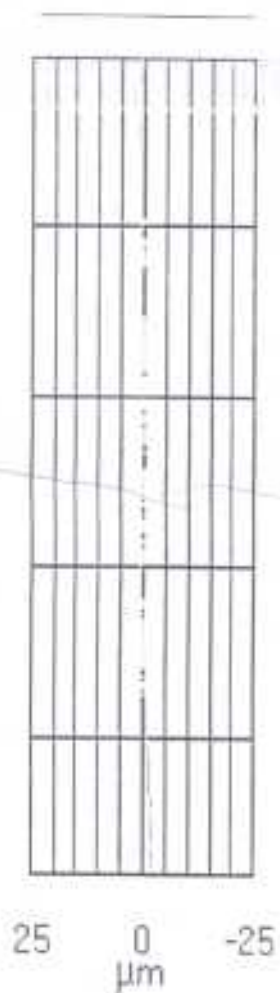
Attachment	<u>4</u>
Page	<u>17</u>
Reference	<u> </u>

WORD # 0533608 4.6L-2V REMANUFACTURED BLOCK SERIAL # 7077255 WORK REQUEST
 CYLINDER BORE WEAR REQ. BY: GPAWCZUK X-26532

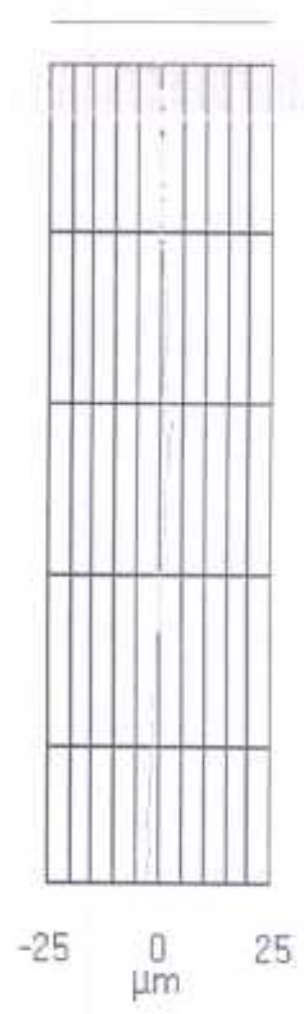
DATE : 3/26/04

OPERATOR : vchhun

E.M.D.O. FORD MOTOR CO.	ENGINE : 4.6L-2V CYLINDER : 8	TEST : B2 DIAMETER : 90.226mm	FILE : PAGE : 33
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1mm
6mm
11mm
16mm
21mm



ANGLE : 0 °
 STARTING HEIGHT 1 mm
 END HEIGHT 25 mm
 STRAIGHTNESS 0° 2.2 μm
 STRAIGHTNESS 180° 4.67 μm
 CONICITY-5.09 μm
 PARALLELISM 6.86 μm

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Reference	

WORD # 0533608 4.6L-2V REMANUFACTURED BLOCK SERIAL # 7077255 WORK REQUEST
 CYLINDER BORE WEAR REQ. BY: CPAWCZUK X-26532

DATE : 3/26/04

OPERATOR : vchhun

E.M.D.O. FORD MOTOR CO.	ENGINE : 4.6L-2V CYLINDER : 1	TEST : B2 DIAMETER : 90.226mm	FILE : PAGE : 1
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VG UPDATE

05.11.04

**VG SURVEILLANCE PANEL
MOTOR CITY**

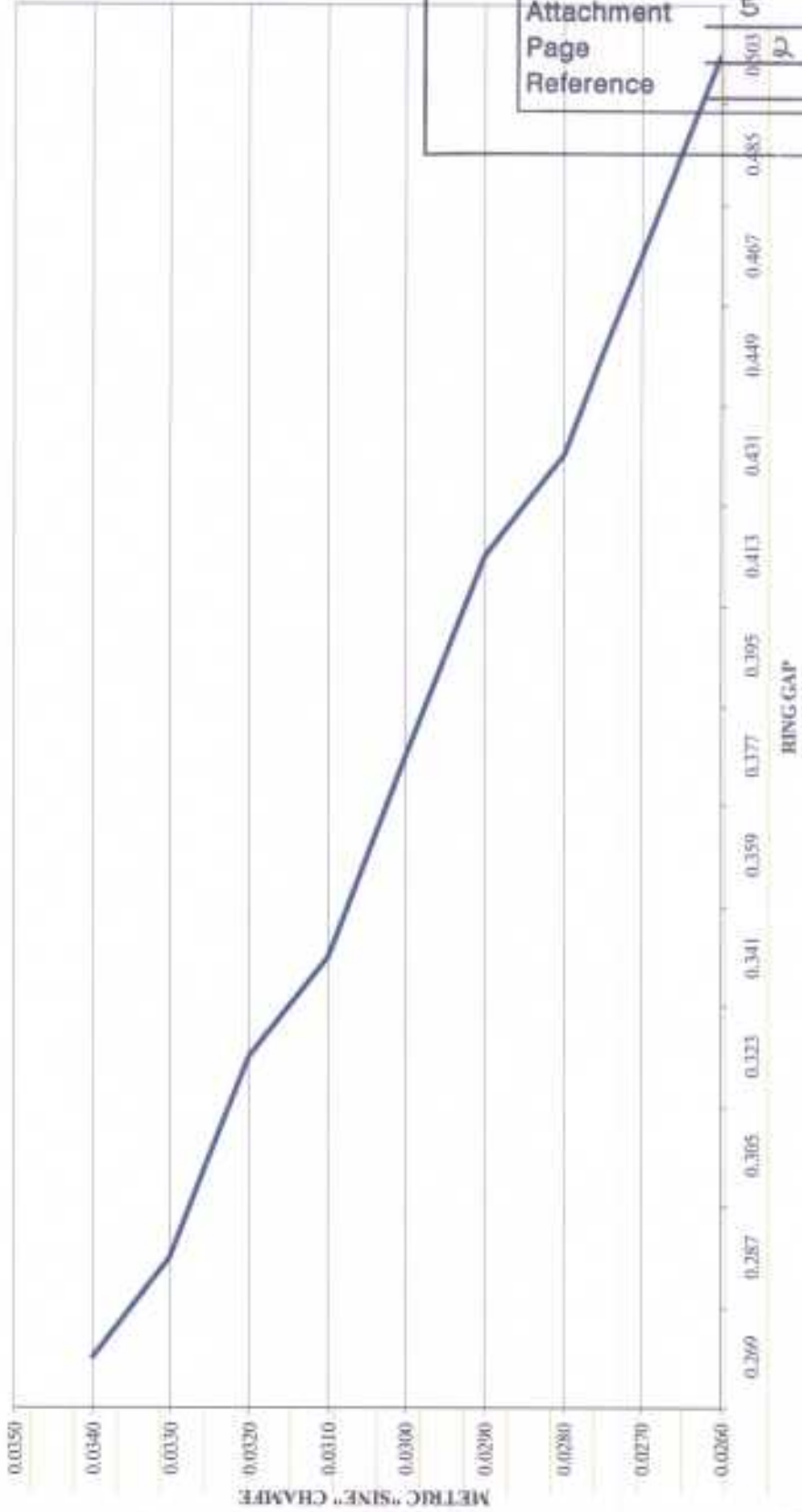
Page
Reference

5

1

B CHAMFER TO RING GAP

METRIC B CHAMFER TO RING GAP



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Reference

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GAP PROGRAM

Automotive Research Sequence VG Ring Gap Calculator

Block Number: Build Date: Mechanic:

Select Build Size: **CONSTANT**

Cyl Num	AVG BORE DIA	PISTON SKIRT @ 42mm	Land to Bore	Ring Land Chamfer	Measured Values				Calculated			Rings Cut to		Chamfer		
					0.125 CONST	0.250 CONST	0.375 CONST	0.500 CONST	Target Top Ring Gap	Target 2nd Ring Gap	Actual Top Ring Gap	Actual 2nd Ring Gap	Top Ring	2nd Ring	Top Ring	2nd Ring
1	3.5619	3.5605	0.0014	0.018	0.4700	0.3750	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
2	3.5620	3.5605	0.0015	0.018	0.4700	0.3700	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
3	3.5621	3.5607	0.0014	0.018	0.4700	0.3700	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
4	3.5620	3.5606	0.0014	0.017	0.4700	0.3700	0.4000	0.3300	0.031	0.033	0.031	0.033	None	None	None	None
5	3.5620	3.5606	0.0014	0.018	0.4700	0.3700	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
6	3.5621	3.5607	0.0014	0.018	0.4700	0.3700	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
7	3.5619	3.5605	0.0014	0.018	0.4700	0.3700	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
8	3.5621	3.5607	0.0014	0.018	0.4700	0.3700	0.4000	0.3300	0.030	0.032	0.030	0.032	None	None	None	None
Avg	3.5620	3.5606	0.00141	0.0179	0.470	0.371	0.400	0.330	0.030	0.032	0.030	0.032	None	None	None	None

Rework Data

Cyl Num	Top Ring	2nd Ring	Top Ring	2nd Ring	Top Ring	2nd Ring	Top Ring	2nd Ring
1								
2								
3								
4								

Top Ring Gap Increase

Performed in Cylinder Master

Cyl Num	Pre Test Measure	Post Test Measure
1		
8		

SIZES

0.125	0.012	0.025 "B" LIMITS
0.250	0.001	0.002 BORE LIMITS
0.375	0.020	0.040 GAP LIMITS
0.500	0.0014	SMOOTHER

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3

Qi LIMITS BY TEST TYPE

READING	VG	SET POINT	%	IVA	SET POINT	%	IIIIG	POINT	SET POINT	%
HUMIDITY	0.150	11.4	1.32	0.800	11.4	7.02	na	na	na	na
COOL FLOW	0.530	48.0	1.10	0.200	30.0	0.67	1.430	160	0.89	0.89
COOL OUT	0.290	85.0	0.34	0.120	55.0	0.22	0.460	40	1.15	1.15
EBP	0.080	107.0	0.07	0.160	103.0	0.16	0.080	106	0.08	0.08
AIR PRESS	0.010	0.1	20.00	0.003	0.1	6.00	0.009	0.05	18.00	18.00
AIR TEMP	0.200	30.0	0.67	0.290	32.0	0.91	na	na	na	na
OIL IN TEMP	0.210	100.0	0.21	0.300	59.0	0.51	0.420	155	0.27	0.27
SPEED	1.900	2900.0	0.07	6.500	1500.0	0.43	5.000	3600	0.14	0.14
MAP	0.080	69.0	0.12	na	na	na	na	na	na	na
RAC TEMP	0.370	85.0	0.44	na	na	na	na	na	na	na
RAC FLOW	0.150	15.0	1.00	0.500	10.0	5.00	na	na	na	na
TORQUE	na	na	na	0.500	25.0	2.00	0.020	250	0.91	0.91

VG Qi CHANGES

- Qi PARAMETERS WERE REVIEWED BY TMC FOR ALL STANDS
- FOLLOWING CHANGES RECOMMENDED:
 - +- 0.40 FOR MAP
 - +- 0.17 FOR EBP
- MOTION: RECOMMEND CHANGING THE MAP Qi UPPER AND LOWER CONTROL LIMITS TO +- 0.40 AND THE EBP LIMITS TO +- 0.17.

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SEQUENCE VG FUEL REPORT

June 11, 2004

SALEABLE GALLONS AT HALTERMANN PRODUCTS	166,000
GALLONS SHIPPED 11 MONTH PERIOD 6/1/2003 – 5/1/2004	182,500
AVERAGE USAGE PER MONTH	16,590
NUMBER OF TESTS SUPPORTED BY PRESENT INVENTORY	237
NUMBER OF MONTHS OF INVENTORY ON HAND	10

PRODUCT: **SVG2M2**

Batch No.: 9906416 9906416 9906416 9906416 9906416

After adj

1211 gal IC4

PRODUCT CODE: **HF295**

Tank No.: 74 74 74 74 74

Analysis Date: 4/1/2004 3/2/2004 2/5/2004 12/31/2003 12/10/2003

TEST	METHOD	UNITS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
Distillation - IBP	ASTM D86	°F	88	80	82	88	95
5%		°F	117	105	110	115	129
10%		°F	131	123	126	129	147
20%		°F	156	151	152	154	171
30%		°F	186	183	184	184	194
40%		°F	217	216	217	216	209
50%		°F	232	232	232	232	230
60%		°F	243	243	242	243	242
70%		°F	258	257	258	258	246
80%		°F	296	295	297	296	264
90%		°F	343	343	344	344	333
95%		°F	360	359	361	361	354
Distillation - EP		°F	402	406	405	406	401
Recovery		vol %	98.3	97.3	97.3	98.1	98.2
Residue		vol %	1.0	1.0	1.0	1.0	1.0
Loss		vol %	0.7	1.7	1.7	0.9	0.8
Gravity	ASTM D4052	*API	56.5	56.6	56.7	56.7	56.8
Specific Gravity	ASTM D4052	-	0.752	0.752	0.752	0.752	0.752
Reid Vapor Pressure	ASTM D323	psi	9.1	9.0	9.0	9.2	9.2
Reid Vapor Pressure	ASTM D5191	psi	9.1	8.9	8.9	9.0	9.1
Sulfur	ASTM D4294	wt %					<0.01
Oxidation Stability	ASTM D525	minutes	>1440	>1440			>1440
Existent gum, unwashed	ASTM D381	mg/100mls	2	1	1	1	1
Existent gum, washed	ASTM D381	mg/100mls	<1	<1	<1	<1	<1

Haltermann

SVG-M-2 tank adjustment data summary

Update: 5-10-04

	D5191				D4052			
Date of Adjustment	Blendstock used	Amount used	RVP before Adjustment	RVP after Adjustment	API Gravity	Amount Adjusted	% Adjusted	
Jun-99			9.20	9.20	57.3	1,114,350	0.00	
Dec-99	Initial batch made	0	9.15	9.15	57.2	1,068,530	0.00	
Mar-00		0	9.10	9.10	57.2	1,031,030	0.00	
Jun-00		0	9.10	9.10	57.0	900,325	0.00	
Sep-00		0	9.00	9.00	57.0	804,802	0.00	
Dec-00		0	9.00	9.00	57.0	734,167	0.00	
Mar-01		0	8.90	8.90	56.9	695,111	0.00	
May-01	Isobutane	4212	8.80	9.15	57.4	638,231	0.66	
Aug-01	Isobutane	3505	8.70	9.20	57.3	580,804	0.60	
Aug-01	Isopentane	1000	8.70	9.20	57.3	580,804	0.17	
Dec-01		0	9.10	9.10	57.2	532,485	0.00	
Mar-02	Isobutane	3327	8.7	9.2	57.3	485092	0.69	
Mar-02	Isopentane	500	8.7	9.2	57.3	485092	0.10	
Jun-02		0	9.1	9.1	57.3	479,454	0.00	
Sep-02		0	8.9	8.9	57.1	458,454	0.00	
Dec-02		0	8.8	8.8	57.1	390,565	0.00	
Feb-03	Isobutane	468	8.6	9.1	56.9			
Jun-03		0	8.9	8.9	56.4		0.00	
Oct-03	Isobutane	1508	8.65	9.2	57.4	295,793	0.51	
Dec-03		0	8.7	9.1	56.8		0.00	
Feb-04		0	8.9	8.9	56.7		0.00	
Apr-04	Isobutane	1211	8.7	9.1	57.3	189,754	0.64	

* - Isobutane & Isopentane added at same time.

ASTM SEQUENCE V SURVEILLANCE PANEL

SCOPE AND OBJECTIVES

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SCOPE

The Sequence V Surveillance Panel is responsible for the surveillance and continued improvement of the Sequence VG test documented in ASTM Standard D6593 as updated by the Information Letter System. Data on test precision and laboratory versus field correlation will be solicited and evaluated at least every six months. Improvements in rating technique, test operation, test monitoring and test validation will be accomplished through continual communication with the Test Sponsor, ASTM Test Monitoring Center, ASTM BO.01, Passenger Car Engine Oil Classification Panel, ASTM Light Duty Rating Task Force, ASTM Committee B0.01, CMA Monitoring Agency and CRC Motor Rating Methods Group. Actions to improve the process will be recommended when deemed appropriate based on input from the preceding. Industry transition to new engine hardware batches will be monitored and redistribution of existing hardware facilitated to accomplish uniform industry implementation. Development and correlation of updated test procedures with previous test procedures will be reviewed by the panel. This process will provide the best possible test procedure for evaluating automotive lubricant performance with respect to the lubricant's ability to prevent engine sludge, engine varnish, cam lobe wear, oil screen plugging, oil ring clogging and ring sticking.

Objectives

1. Establish VG fuel reblend confirmation trial timing
2. Approval testing of next VG fuel reblend
3. Cylinder Bore Task Group
4. Review need for Rate & Report items
5. Current engine distribution plan
6. Future engine supply plan
7. Establish a formal system for final redistribution of 1994 model year hardware, referencing of test stands and introduction of 2000 model year hardware

Target Date

May 2005
Nov. 2005
June 2003
May 2003
Jan. 2002 (Done)
Nov. 2003 (Done)
May 2003 (Done)

G. R. FARNSWORTH, Chairman
Sequence VG Surveillance Panel

Updated May 11, 2004
Detroit, Michigan

Sequence VG Surveillance Panel
May 11, 2004
2:30PM – 5:00PM
Detroit, Michigan

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Motions and Action Items

As Recorded at the Meeting by Bill Buscher

1. Action Item - Surveillance Panel Chairman to request from ACC candidate roller follower pin wear and ring wear data for review to determining if these parameters are meaningful. Due data January 2005.
2. Motion - Spark plugs AWSF32PP (current) and AGSF32FM (kit) are interchangeable for the Sequence VG test.
Bill Buscher / Dave Glaenzer / 8-0-1
3. Motion - Modify Sequence VG procedure to allow for the option to clean piston skirts. Examine the skirt surfaces for discoloration. If the before test rating is less than 10.0 on the CRC varnish rating scale, clean the piston skirts with Scotch Brite 7445. Reject any pistons from which the discoloration cannot be removed. Rinse cleaned pistons with mineral spirits and allow to air dry before use.
Dan Worcester / Jerry Brys / 9-0-0
4. Motion - Recommend changing the MAP Qi upper and lower control limits to +/- 0.40 and the EBP Qi upper and lower control limits to +/- 0.17.
Dan Worcester / Dave Glaenzer / 9-0-0
5. Action Item - Rich Grundza to organize a conference call to develop a plan for introduction of a new Sequence VG fuel batch. Task Force to include Gordon Farnsworth, Rich Grundza, Jim Carter and any other Surveillance Panel member that is interested.
6. Action Item - Labs to calculate their Sequence VG fuel usage in all test types and report to Surveillance Panel Chairman.
7. Action Item - Surveillance Panel Chairman will report that the Surveillance Panel discussed the GF-4 category calibration oil and the

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Surveillance Panel felt that the current slate of calibration oils provided the best selection to date. No other oils for the VG have been brought to the chair's attention to date or presented at this meeting for discussion.