

AD-A141 881

INSPECTION DATA FOR SPARK IGNITION ENGINES FROM AIR
FORCE NONTACTICAL VEH..(U) SOUTHWEST RESEARCH INST SAN
ANTONIO TX ARMY FUELS AND LUBRICA... W E BUTLER ET AL.

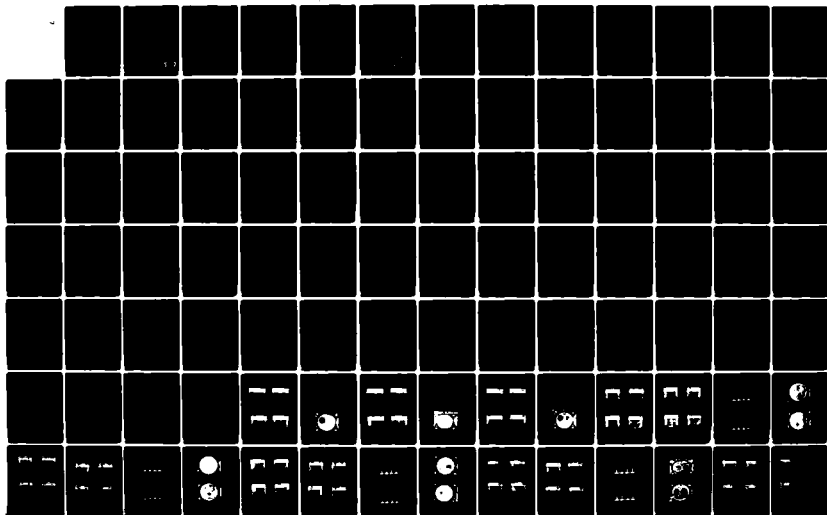
1/2

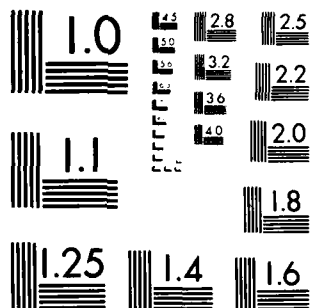
UNCLASSIFIED

JAN 83 AFLRL-163-VOL-2 DAAK70-82-C-0001

F/G 11/8

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

AD-A141 881

12



INSPECTION DATA FOR SPARK- IGNITION ENGINES FROM AIR FORCE NONTACTICAL VEHICLES (MEEP Project H79-C, Synthetic Oils)

**INTERIM REPORT
AFLRL No. 163**

VOLUME II — APPENDICES

By

W. E. Butler, Jr.

E. A. Frame

E. C. Owens

**U.S. Army Fuels and Lubricants Research Laboratory
Southwest Research Institute
San Antonio, Texas**

and

T. C. Bowen

**U.S. Army Belvoir Research and Development Center
Materials, Fuels, and Lubricants Laboratory
Fort Belvoir, Virginia**

Contract No. DAAK70-82-C-0001

Approved for public release; distribution unlimited

January 1983

DTIC FILE COPY

**DTIC
ELECTE
JUN 7 1984
S B**

84 06 04 010

Disclaimers

The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

Trade names cited in this report do not constitute an official endorsement or approval of the use of such commercial hardware or software.

DTIC Availability Notice

Qualified requestors may obtain copies of this report from the Defense Technical Information Center, Cameron Station, Alexandria, Virginia 22314.

Disposition Instructions

Destroy this report when no longer needed. Do not return it to the originator.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

DD FORM 1473
1 JAN 73

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. ABSTRACT (Cont'd)

potential methods of cost reductions in operation of government vehicles. This MKEP project was requested by the Triservices through the Joint Deputies for Laboratory Committee (JDLC). Of approximately 450 general-purpose vehicles selected by 11 Air Force installations for this program, 29 of the vehicles were chosen for engine inspection at USAFLRL, San Antonio, TX. These 29 engines were disassembled by AFLRL personnel and inspected in accordance with CRC rating methods. Wear measurements were made of selected parts, and photographs were taken of representative parts from each engine. For various reasons the three engines from Sondrestrom Air Force Base were eliminated from the test at this point and are not included in this report. The number of engines was thus reduced to 26. A comparison was also made between the lubricants used in the test by utilizing the oil analyses data provided by the Technical Service Center, Joint Oil Analysis Program Laboratory in Pensacola, FL and copies of the individual maintenance records provided by each installation. Based solely on the results of the engine tear-down inspections and in consideration of the data developed from oil analyses and maintenance records, synthetic lubricants can be successfully used in spark ignition engines. Statistical studies revealed no significant differences could be determined which would clearly indicate if the use of any one test oil would be more advantageous than the use of any of the other test lubricants. Final conclusions, of course, reside with the Warner Robins Air Logistics Center where coordination of the compilation of a report covering all aspects of the program will be made.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

FOREWORD/ACKNOWLEDGMENTS

This report was prepared by the U.S. Army Fuels and Lubricants Research Laboratory (AFLRL) located at Southwest Research Institute, San Antonio, TX, under Contract No. DAAK70-82-C-0001. It presents the work done by AFLRL personnel for the period September 1981 through October 1982. This work was performed as part of MEEP Project H-79-1C, Synthetic Oils initiated by the U.S. Air Force at Warner Robins Air Logistics Center (AFLC), Robins Air Force Base, GA in response to a request by the Triservices through the Joint Deputies for Laboratory Committee (JDLC). The Project monitor for the Air Force was Mr. C.H. Coffey, Warner Robins Air Force Base. The Project Monitor and Contracting Officer's Representative for the Army was Mr. F.W. Schaeckel, Belvoir Research and Development Center, STRBE-VF, Ft. Belvoir, VA.

The authors acknowledge with appreciation the cooperation and immediate response by MEEP and Air Force maintenance personnel, without which this report could not have been successfully concluded. Also appreciated was the help and support of Mr. Sidney J. Lestz, USAFLRL.

Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By PER CALL	
Distribution/ JC	
Availability Codes	
Dist	Avail and/or Special
A-1	

TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
VOLUME I		
I.	INTRODUCTION.	5
II.	DETAILS OF TEST	5
	Test Procedures	5
	Test Lubricants-Synthetic and Control	8
III.	RESULTS OF TEST	10
	Used Oil Analyses	10
	After-Test Engine Inspections	15
	Performance Summary	24
V.	CONCLUSIONS	25
VI.	RECOMMENDATIONS	26
VII.	REFERENCES.	26

VOLUME II

APPENDICES

A.	Engine Inspection Data-Ratings	A-1
B.	Engine Inspection Data-Wear Measurements	B-1
C.	Engine Inspection Data-Photographs	C-1
D.	Lubricant Analyses Data-Means and Standard Deviations	D-1
E.	Statistical Analysis	E-1

APPENDIX A

ENGINE INSPECTION DATA
- RATINGS -

TABLE A-1. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)		
	28(79B5659) Green	26(79B5660) Yellow	27(79B5668) Blue(C)
USAF Academy CO			
Ford, 6 cyl, 200 CID			
<u>Sludge Ratings (Merit)*</u>			
Rocker Arm Cover	9.63	9.68	9.62
Oil Pan	9.40	9.53	9.40
Valve Deck	9.75	9.75	9.75
Underside of Block	**	**	**
Timing Gear Cover	#	#	#
Average Ratings	9.6	9.7	9.6
<u>Varnish Ratings (Merit)*</u>			
Piston Skirts			
Thrust	6.22	6.35	8.53
Anti-Thrust	6.25	6.32	8.47
Rocker Arm Cover	6.00	6.88	6.50
Cylinder Walls			
Thrust	8.83	9.08	9.65
Anti-Thrust	9.00	8.93	9.65
Front	5.50	5.83	9.10
Back	5.47	5.67	8.85
Oil Pan	6.95	7.23	6.90
Lifter Bodies	9.01	9.13	9.83
Lifter Plungers	10.00	10.00	10.00
Average Ratings	7.3	7.5	8.7
<u>Other Ratings</u>			
Oil Ring, % Clogging	1.00	1.00	1.00
Oil Screen, % Clogging	#	#	#
Intake Valve Deposits*	6.68	6.02	6.55
Ring Sticking	Free	Free	Free

* 10 = Clean.

Part not with the engine when uncrated.

TABLE A-2. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)		
George AFB, CA	40(79B2533)	39(79B2534)	38(79B2539)
Dodge, V-8, 318 CID	Green	Yellow	Blue(C)
<u>Sludge Ratings (Merit)*</u>			
Left Rocker Arm Cover	**	**	**
Right Rocker Arm Cover	**	**	**
Oil Pan	**	**	**
Underside of Block	**	**	**
Left Valve Deck	9.75	9.75	9.75
Right Valve Deck	9.75	9.75	9.75
Pushrod Chamber	9.75	9.75	9.75
Timing Gear Cover	**	**	**
Average Ratings	9.75	9.75	9.75
<u>Varnish Ratings (Merit)*</u>			
Piston Skirts			
Thrust	5.99	5.89	6.125
Anti-Thrust	5.94	6.98	6.438
Left Rocker Arm Cover	**	**	**
Right Rocker Arm Cover	**	**	**
Cylinder Walls			
Thrust	7.66	8.25	8.56
Anti-Thrust	7.69	8.63	8.56
Front	5.06	6.75	5.30
Back	4.81	7.25	5.35
Oil Pan	**	**	**
Lifter Bodies	8.89	8.59	8.75
Lifter Plungers	10.00	10.00	10.00
Average Ratings	7.0	7.8	7.4
<u>Other Ratings</u>			
Oil Ring, % Clogging	1.00	1.00	1.00
Oil Screen, % Clogging	**	**	**
Push Rods, % Clogging	#	#	#
Intake Valve Deposits	6.63	8.76	8.99
Ring Sticking	Free	Free	Free

* 10 = Clean

** Parts not with the engine when uncrated

Solid Push Rods

TABLE A-3. ENGINE INSPECTION DATA-RATINGS

<u>Type Oil</u>	<u>AFLRL No. (Vehicle No.)</u>	
	<u>29(79B1734)</u>	<u>32(79B1735)</u>
<u>GRAND FORKS AFB, ND.</u>	<u>Yellow</u>	<u>Blue(B)</u>
<u>Chevrolet, V-8, 350 CID</u>		
<u>Sludge Ratings (Merit)*</u>		
Left Rocker Arm Cover	9.49	9.40
Right Rocker Arm Cover	9.51	9.48
Oil Pan	9.51	9.33
Underside of Intake Manifold	9.69	@
Left Valve Deck	9.50	9.50
Right Valve Deck	9.50	9.50
Push Rod Chamber	9.50	9.50
Timing Gear Cover	10.00**	10.00
Average Ratings	9.6	9.5
<u>Varnish Ratings (Merit)*</u>		
Piston Skirts		
Thrust	7.55	6.26+
Anti-Thrust	7.10	6.23+
Left Rocker Arm Cover	6.66	6.30
Right Rocker Arm Cover	6.95	7.80
Cylinder Walls		
Thrust	9.19	9.125
Anti-Thrust	8.75	9.063
Front	8.21	7.363
Back	8.61	7.850
Oil Pan	7.05#	6.78
Lifter Bodies	8.69##	8.79++
Lifter Plungers	9.85	10.00
Average Ratings	8.1	7.8
<u>Other Ratings</u>		
Oil Ring, % Clogging	1.00	1.00
Oil Screen, % Clogging	1.00	<1.00
Push Rods, % Clogging	0.00	0.00
Intake Valve Deposits	7.19	7.06
Ring Sticking	Free	Free

* 10 = Clean

** The timing gear cover was metal; usually plastic; cover looked too clean

At some time the pan had developed a leak and the hole was brazed

Lifter body No. 1 - Body scuffed where it rides in block;

No. 5 - Cracked	No. 11 - Chipped, scuffed & worn
No. 6 - Chipped & worn	No. 12 - Chipped & scuffed
No. 7 - Chipped	No. 13 - Light wear & scuffing
No. 8 - Cracked, worn & scuffed	No. 14 - Cracked, scuffed & worn
No. 10 - Worn & scuffed	No. 15 - Light scuffing
No. 16 - Light scuffing	

@ Not with engine when engine uncanted.

+ Piston No. 1 - 75% scuffing thrust side
 No. 3 - 20% scuffing thrust side
 No. 4 - 50% light scuffing thrust side; 15% scuffing anti-thrust side
 No. 5 - 15% light scuffing thrust side
 No. 6 - 15% scuffing and light scratches anti-thrust side
 No. 7 - 15% scuffing thrust side
 No. 8 - 100% scuffing thrust side; 70% light scuffing anti-thrust side; this was not a piston originally with this engine

++ The lifter bodies in this engine were different than the lifter bodies in the other 350 CID engines.

TABLE A-4. ENGINE INSPECTION DATA-RATINGS

Oil Type	AFLRL No. (Vehicle No.)	
	42(78B5038)	43(78B5646)
	Green	Yellow
<u>Hancock Field, NY</u>		
<u>(42) Plymouth, 6 cyl, 225 CID</u>		
<u>(43) Ford, 6 cyl, 300 CID</u>		
<u>Sludge Ratings (Merit)*</u>		
Rocker Arm Cover	**	**
Side Cover	#	#
Oil Pan	**	**
Valve Deck	**	**
Push Rod Chamber	#	#
Timing Gear Cover	**	**
<u>Varnish Ratings (Merit)*</u>		
Piston Skirts		
Thrust	5.57	9.95
Anti-Thrust	5.43	9.95
Rocker Arm Cover	**	**
Cylinder Walls		
Thrust	7.23	9.95
Anti-Thrust	8.02	9.95
Front	5.47	9.95
Back	3.17	9.95
Oil Pan	**	**
Lifter Bodies	7.13	9.95
Lifter Plungers	<u>Solid Lifters</u>	<u>9.95</u>
Average Ratings	6.0	9.95
<u>Other Ratings</u>		
Oil Ring, % Clogging	1.00	<1.00
Oil Screen, % Clogging	**	**
Push Rod, % Clogging	**	**
Intake Valve Deposits	**	**
Ring Sticking	##	Free

* 10 = Clean

** Not with engine when uncanted

Does not apply to this engine

No. 1 and 2 rings sluggish on No. 1 piston; oil rings stuck on pistons No. 1 through No. 6

TABLE A-5. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)		
	25(79B2271)	23(79B2270)	24(79B2272)
	Green	Yellow	Blue(A)
<u>Lackland AFB, TX</u>			
<u>Ford, 6 cyl, 300 CID</u>			
<u>Sludge Ratings (Merit)*</u>			
Rocker Arm Cover	9.48	9.50	9.75
Side Cover	9.18	9.50	9.75
Oil Pan	9.34**	9.64	9.63**
Valve Deck	9.50	9.50**	9.75
Pushrod Chamber	9.50	9.75	9.75
Timing Gear Cover	9.49	9.48	9.63
Average Ratings	9.4	9.6	9.7
<u>Varnish Ratings (Merit)*</u>			
Piston Skirts			
Thrust	9.02	9.00	6.18**
Anti-Thrust	9.10	8.98	7.38**
Rocker Arm Cover	6.83	6.00	6.875
Cylinder Walls			
Thrust	9.42	9.78	7.70
Anti-Thrust	9.50	9.80	7.62
Front	9.00	6.13	6.18
Back	9.00	6.48	6.30
Oil Pan	6.60	6.85	6.275
Lifter Bodies	9.36	9.40	9.20
Lifter Plungers	10.00	9.94	10.00
Average Ratings	8.8	8.2	7.4
<u>Other Ratings</u>			
Oil Ring, % Clogging	1.00	1.00	1.00
Oil Screen, % Clogging	<1.00	<1.00	<1.00
Push Rod, % Clogging	Open	Open	Open
Intake Valve Deposits	6.68	5.52	4.00
Ring Sticking	Free	Free	Free

* 10 = Clean

** This part contained "Grey Paint" deposits as a result of having been operated with gasoline with a relatively high lead content.

TABLE A-6. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)	
	30(79B1736)	31(79B1759)
	Green	Blue(C)
<u>Minot AFB, ND</u>		
<u>Chevrolet, V-8, 350 CID</u>		
<u>Sludge Ratings (Merit)*</u>		
Left Rocker Arm Cover	9.49	9.66
Right Rocker Arm Cover	9.71	9.57
Oil Pan	9.33**	9.27
Underside of Intake Manifold	#	#
Left Valve Deck	9.75	9.75
Right Valve Deck	9.75	9.75
Push Rod Chamber	9.75	9.75
Timing Gear Cover	10.00	10.00
Average Ratings	9.7	9.7
<u>Varnish Ratings (Merit)*</u>		
Piston Skirts		
Thrust	7.48	8.76++
Anti-Thrust	7.28	8.81++
Left Rocker Arm Cover	5.85	7.00
Right Rocker Arm Cover	6.50	6.90
Cylinder Walls		
Thrust	8.44	9.50
Anti-Thrust	8.19	9.50
Front	7.90	9.31
Back	8.13	9.31
Oil Pan	6.75	6.975
Lifter Bodies	9.12##	9.15@
Lifter Plungers	9.85##	9.90
Average Ratings	7.8	8.6
<u>Other Ratings</u>		
Oil Ring, % Clogging	1.00	1.00
Oil Screen, % Clogging	1.00	<1.00
Push Rods, % Clogging	0.00	0.00
Intake Valve Deposits	6.69	6.50@@
Ring Sticking	Free+	Free

* 10 = Clean

** The A and B sludge depths looked like an oil emulsion (water in oil).

Not with engine when uncanted.

All lifter plungers had light to medium scuffing; all lifter bodies were cracked, chipped and worn; No. 15 lifter plunger showed severe wear; the cam lobe for lifter No. 15 was worn round (no lift).

+ No rings on pistons No. 6 and No. 8; pistons No. 5 and No. 7 had oil emulsion under crown to ring land (as in ** above).

++ Piston No. 1 - 35% scuffing on anti-thrust side

No. 2 - 30% scuffing on anti-thrust side; coolant on ring land area

No. 3 - 25% scuffing on anti-thrust side; coolant on ring land area

No. 4 - 15% light scuffing on anti-thrust side

No. 5 - 45% scuffing on anti-thrust side

No. 6 - 5% light scuffing on anti-thrust side

No. 7 - 5% light scuffing on anti-thrust side

No. 8 - 70% scuffing on thrust side; 20% scuffing on anti-thrust side

@ No. 4 lifter body shows heavy wear; all show some scuffing (scuffed areas below wear areas).

@@ Looks like some of the deposits on intake valves had flaked off.

TABLE A-7. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)		
	<u>37(79B5212)</u> Green	<u>36(78B9187)</u> Yellow	<u>41(78B9188)</u> Blue(D)
<u>Myrtle Beach, SC</u>			
<u>Plymouth, 6 cyl, 225 CID</u>			
<u>Sludge Ratings (Merit)*</u>			
Rocker Arm Cover	9.10	8.77	9.50
Oil Pan	9.15**	9.21	9.20
Valve Deck	9.75	9.65	9.75
Timing Gear Cover	#	#	#
Average Ratings	9.3	9.2	9.5
<u>Varnish Ratings (Merit)*</u>			
Piston Skirts			
Thrust	5.88	6.33	6.55
Anti-Thrust	5.38	6.28	6.72
Rocker Arm Cover	4.785	2.90	2.75
Cylinder Walls			
Thrust	7.58	7.82	7.48
Anti-Thrust	7.32	7.90	7.10
Front	6.43	6.08	6.65
Back	4.17	4.70	3.78
Oil Pan	5.20	3.875	5.27
Lifter Bodies			
(solid lifters)	7.24	5.94	4.74
Average Ratings	6.0	5.8	5.7
<u>Other Ratings</u>			
Oil Ring, % Clogging	1.00	1.00	1.00
Oil Screen, % Clogging	<1.00	<1.00	0.00
Intake Valve Deposits	6.30	5.52	5.92
Ring Sticking	Free	Free	Free

* 10 = Clean

** Piece of plastic oil pump gear found in oil pan; engine looks like it may have run awhile with no oil pressure.

The timing gear covers look like they were cleaned up or come from something else; "rusty".

TABLE A-8. ENGINE INSPECTION DATA-RATINGS

	AFLRL No. (Vehicle No.)	
	46(78B4766) Green	45(78B4768) Blue(B)
<u>Oil Type</u>		
<u>Offutt AFB, NE</u>		
<u>Chevrolet, 6 cyl, 292 CID</u>		
<u>Sludge Ratings (Merit)*</u>		
Rocker Arm Cover	9.52	7.70**
Side Cover	9.50	7.50
Oil Pan	6.75	3.35
Valve Deck	9.75	7.50
Push Rod Chamber	9.75	7.50
Timing Gear Cover	5.04	6.90
Average Ratings	8.4	6.7
<u>Varnish Ratings (Merit)*</u>		
Piston Skirts		
Thrust	5.60	5.73#
Anti-Thrust	5.52	5.57
Rocker Arm Cover	4.35	5.08
Cylinder Walls		
Thrust	6.50	5.08
Anti-Thrust	6.75	5.25
Front	4.25	2.18
Back	3.95	2.28
Oil Pan	4.05	8.50
Lifter Bodies	9.80	8.36##
Lifter Plungers	10.00	10.00
Average Ratings	6.1	5.8
<u>Other Ratings</u>		
Oil Ring, % Clogging	1.00	2.00
Oil Screen, % Clogging	1.00	5.00
Push Rod, % Clogging	0.00	0.00
Intake Valve Deposits	6.58	6.22
Ring Sticking	Free	Free

* 10 = Clean

** This part contained "Grey Paint" deposits as a result of having been operated with gasoline with a relatively high lead content.

Wrist pins were tight in all cylinders.

With the exception of the No 4 lifter body these lifters did not look like they belonged to this engine (rating wise); No. 4 lifter body was rated 3 in the merit system (about one-third as much as each of the other lifters; lifter bodies No. 4, 5, 7, 8, 9, 10, 11, and 12 were worn to a concave surface ("dished") on top of rating area.

TABLE A-9. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)		
	48(78B4569)	44(78B4571)	47(78B8831)
	Green	Yellow	Blue(C)
<u>Peterson Field, CO</u>			
<u>Chevrolet, 6 cyl, 292 CID</u>			
<u>Sludge Ratings (Merit)*</u>			
Rocker Arm Cover	9.75	9.60#	9.70
Side Cover	**	**	**
Oil Pan	9.6#	5.70#	9.15#
Valve Deck	9.75	9.50#	9.75
Push Rod Chamber	9.75	9.50#	9.75
Timing Gear Cover	**	**	**
Average Ratings	9.7	8.6	9.6
<u>Varnish Ratings (Merit)*</u>			
Piston Skirts			
Thrust	7.0	7.47@	5.85
Anti-Thrust	7.23	7.02	5.80
Rocker Arm Cover	8.00	7.90	6.72
Cylinder Walls			
Thrust	9.75	8.92	7.88
Anti-Thrust	9.80	9.00	8.02
Front	9.62	4.97	4.10
Back	9.57	5.23	3.13
Oil Pan	7.65	6.85@@	6.65
Lifter Bodies	9.75##	9.50	9.17++
Lifter Plungers	10.00	10.00	10.00
Average Ratings	8.8	7.7	6.7
<u>Other Ratings</u>			
Oil Ring, % Clogging	1.00	2.00	1.00
Oil Screen, % Clogging	0.00	1.00	0.00
Push Rod, % Clogging	0.00	**	0.00
Intake Valve Deposits	6.10	9.37	7.63
Ring Sticking	Free	Free+	Free

* 10 = Clean

** Not with engine when uncanted.

These parts contained or exhibited "Grey Paint" deposits as a result of having been operated with gasoline with a relatively high lead content.

Lifter bodies No. 2, 3, 4, 8, 10 were chipped; No. 5 and 6 were cracked and chipped; No. 12 was cracked.

@ "Grey Paint" made rating difficult, however, the ratings given are the best judgement under the circumstances.

@@ Some rust was noted at inspection sites No. 1, 5 through 9, 12 through 15, and 20.

+ Top ring sluggish in pistons 1 and 2; wrist pins tight in all pistons.

++ Lifter bodies No. 1, 3, 4, 5, 6 and 10 were worn to a concave surface at top of rated area; No. 7 was chipped on top edge of rated area.

TABLE A-10. ENGINE INSPECTION DATA-RATINGS

Type Oil	AFLRL No. (Vehicle No.)		
	<u>20(79B5721)</u> Green	<u>21(79B5719)</u> Yellow	<u>22(79B5720)</u> Blue(A)
<u>Randolph AFB, TX</u>			
<u>Ford, 4 cyl, 140 CID</u>			
<u>Sludge Ratings (Merit)*</u>			
Rocker Arm Cover	9.75	9.75	9.40
Front Seal Housing	9.50	9.50	9.00
Oil Pan	9.59	9.40	9.40
Valve Deck	9.75	9.75	9.50
Underside of Block	<u>9.75</u>	<u>9.75</u>	<u>9.50</u>
Average Ratings	9.7	9.6	9.4
<u>Varnish Ratings (Merit)*</u>			
Piston Skirts			
Thrust	7.95	8.83	6.75
Anti-Thrust	8.20	9.10	6.75
Rocker Arm Cover	6.00	5.35	6.75
Cylinder Walls			
Thrust	10.00	10.00	7.625
Anti-Thrust	10.00	9.99	7.30
Front	10.00	9.50	6.675
Back	10.00	9.75	6.575
Oil Pan	<u>9.00</u>	<u>7.75</u>	<u>6.975</u>
Average Ratings	8.9	8.8	7.1
<u>Other Ratings</u>			
Oil Ring, % Clogging	<1.00	<1.00	<1.00
Oil Screen, % Clogging	<1.00	<1.00	1.00
Intake Valve Deposits	5.88	7.15	6.70
Ring Sticking	Free	Free	Free

* 10 = Clean

APPENDIX B

ENGINE INSPECTION DATA-WEAR MEASUREMENTS

NOTE

In this appendix, tables are positioned so that tables using English measurements face the same table using its metric equivalents. For example, pages B-4 and B-5 report on the same items; however, page B-4 uses inches as measurement while page B-5 uses the metric system of measurements.

ENGINE COMPONENTS MEASUREMENTS
U.S. AIR FORCE ACADEMY
ENGINE TYPE: FORD, 6 CYLINDER, 200 CID
VEHICLE NO. 79B5659
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.028	0.029	0.026	0.029	0.030	0.031
Bottom	0.026	0.028	0.026	0.026	0.028	0.029
Cylinder Bore Diameter						
Top	3.6830	3.6817	3.6823	3.6817	3.6823	3.6817
Middle	3.6824	3.6810	3.6814	3.6813	3.6810	3.6820
Bottom	3.6811	3.6820	3.6812	3.6818	3.6810	3.6822
Out-of-round	3.6823	3.6805	3.6815	3.6809	3.6805	3.6808
Taper	0.0006	0.0006	0.0008	0.0006	0.0007	0.0007
	0.0013	0.0012	0.0009	0.0008	0.0007	0.0016
Connecting Rod Bearings						
Journal Diameter	H	H	H	H	H	H
Shell Diameter	2.1232	2.1235	2.1230	2.1230	2.1230	2.1230
	F	F	F	F	F	F
	2.1270	2.1268	2.1269	2.1260	2.1260	2.1264
Camshaft Lobe Lift	I	I	I	I	I	I
	0.244	0.243	0.248	0.139	0.257	0.252
	E	E	E	E	E	E
	0.0014	0.0014	0.0014	0.0014	0.0013	0.0014
Valve Stem to Guide Clearance	I	I	I	I	I	I
	0.0014	0.0014	0.0014	0.0014	0.0013	0.0015
Valve Spring Force	I	I	I	I	I	I
	53	54	54	54	54	55
	55	55	55	53	55	56
Piston Avg. Diameter						
Middle and bottom of skirt	3.6800	3.6793	3.6802	3.6807	3.6806	3.6798
Main Bearings						
Journal Diameter	H	H	H	H	H	H
	2.2478	2.2480	2.2478	2.2478	2.2480	2.2479
	F	F	F	F	F	F
	2.2500	2.2499	2.2499	2.2498	2.2499	2.2500
Shell Diameter						
	2.2500	2.2499	2.2499	2.2499	2.2499	2.2500
Compression Ring Gaps						
Top	0.008-0.016					
Bottom	3.6800-3.6848					
Cylinder Bore Diameter	0.005					
Out-of-round	0.010					
Taper	2.1232-2.1240					
Connecting Rod Bearings	2.1240-2.1255					
Journal Diameter						
Shell Diameter						
Manufacturer's Service Limits, Inches						
Camshaft Lobe Lift	0.245					
Intake						
Exhaust						
Valve Stem to Guide Clearance	0.0008-0.0025					
Intake	0.0010-0.0027					
Exhaust						
Valve Spring Force	51-57 lb @ 1.59"					
Intake						
Exhaust						
Piston Diameter						
Main Bearings						
Journal Diameter						
Shell Diameter						
Manufacturer's Service Limits, Inches						
Piston Diameter	3.6796-3.6802					
Main Bearings	2.2482-2.2490					
Journal Diameter	2.2490-2.2505					
Shell Diameter						

ENGINE COMPONENTS MEASUREMENTS
U.S. AIR FORCE ACADEMY
ENGINE TYPE: FORD, 6 CYLINDER, 200 CID
VEHICLE NO. 79B5659
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.71 ⁺	0.74	0.66	0.74	0.76	0.78
Bottom	0.66	0.71	0.66	0.66	0.71	0.74
Cylinder Bore Diameter						
Top	93.533	93.548	93.533	93.553	93.530	93.551
Middle	93.500	93.523	93.508	93.530	93.518	93.533
Bottom	93.500	93.485	93.510	93.536	93.485	93.523
Out-of-round	0.015	0.015	0.020	0.015	0.069	0.018
Taper	0.033	0.030	0.023	0.020	0.018	0.041
Connecting Rod Bearings						
Journal Diameter	H	H	H	H	H	H
Shell Diameter	F	F	F	F	F	F
Camshaft Lobe Lift	I	I	I	I	I	I
Valve Stem to Guide Clearance	I	I	I	I	I	I
Valve Spring Force [⊖]	I	I	I	I	I	I
Piston Avg. Diameter	93.472	93.454	93.477	93.490	93.487	93.467
Middle and bottom of skirt						
Main Bearings						
Journal Diameter	H	H	H	H	H	H
Shell Diameter	F	F	F	F	F	F

Manufacturer's Service Limits, (mm)

Compression Ring Gaps	0.20-0.41	Camshaft Lobe Lift	6.22	Piston Diameter	93.462-93.477
Top		Intake		Main Bearings	
Bottom		Exhaust		Journal Diameter	57.104-57.125
Cylinder Bore Diameter	93.472-93.594	Valve Stem to Guide Clearance	0.020-0.064	Shell Diameter	57.125-57.163
Out-of-round	0.13	Intake			
Taper	0.25	Exhaust			
Connecting Rod Bearings		Valve Spring Force	227-254 (N-m) @ 40.4 mm		
Journal Diameter	53.929-53.950	Intake			
Shell Diameter	53.950-53.988	Exhaust			

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
+ = Measurements are in mm
⊖ = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
U.S. AIR FORCE ACADEMY
ENGINE TYPE: FORD, 6 CYLINDER, 200 CID
VEHICLE NO. 79B5660
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	0.028	0.025	0.026	0.028	0.027	0.025
Bottom	0.025	0.024	0.025	0.029	0.027	0.026
Cylinder Bore Diameter						
Top	L* 3.6835	L 3.6821	L 3.6829	L 3.6821	L 3.6824	L 3.6824
Middle	3.6819	3.6813	3.6821	3.6814	3.6812	3.6814
Bottom	3.6819	3.6811	3.6823	3.6815	3.6824	3.6816
Out-of-round	0.0001	0.0005	0.0002	0.0010	0.0007	0.0007
Taper	0.0016	0.0010	0.0017	0.0006	0.0010	0.0008
Connecting Rod Bearings						
Journal Diameter	H 2.1236	H 2.1230	H 2.1230	H 2.1230	H 2.1230	H 2.1230
Shell Diameter	F 2.1260	F 2.1264	F 2.1269	F 2.1275	F 2.1270	F 2.1270
Camshaft Lobe Lift	I 0.244	I 0.240	I 0.239	I 0.244	I 0.244	I 0.241
Valve Stem to Guide Clearance	I 0.0020	I 0.0019	I 0.0018	I 0.0018	I 0.0019	I 0.0020
Valve Spring Force	I 55	I 54	I 55	I 56	I 56	I 55
Piston Avg. Diameter	3.6808	3.6793	3.6799	3.6797	3.6804	3.6797
Middle and bottom of skirt						
Main Bearings						
Journal Diameter	H 2.2485	H 2.2482	H 2.2484	H 2.2480	H 2.2482	H 2.2480
Shell Diameter	F 2.2505	F 2.2508	F 2.2502	F 2.2504	F 2.2502	F 2.2504
Compression Ring Caps						
Top	0.008-0.016					
Bottom	3.6800-3.6848					
Cylinder Bore Diameter	0.005					
Out-of-round	0.010					
Connecting Rod Bearings						
Journal Diameter	2.1232-2.1240					
Shell Diameter	2.1240-2.1250					

Manufacturer's Service Limits, Inches

Camshaft Lobe Lift						
Intake	0.245					
Exhaust	0.245					
Valve Stem to Guide Clearance	0.0008-0.0025					
Intake	0.0010-0.0027					
Exhaust						
Valve Spring Force	51-57 lb @ 1.59"					
Intake						
Exhaust						
Piston Diameter						
Main Bearings						
Journal Diameter						
Shell Diameter						

ENGINE COMPONENTS MEASUREMENTS

U.S. AIR FORCE ACADEMY

ENGINE TYPE: FORD, 6 CYLINDER, 200 CID

VEHICLE NO. 79B5668

TYPE OIL: BLUE (C)

[illegible]

ENGINE COMPONENTS MEASUREMENTS
U.S. AIR FORCE ACADEMY
ENGINE TYPE: FORD, 6 CYLINDER, 200 CID
VEHICLE NO. 79B5668
TYPE OIL: BLUE (C)

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.76*	0.66	0.71	0.71	0.71	0.71
Bottom	0.61	0.71	0.69	0.61	0.69	0.66
Cylinder Bore Diameter						
Top	L 93.533	T 93.541	L 93.518	T 93.548	L 93.533	T 93.530
Middle	93.500	93.525	93.487	93.520	93.502	93.518
Bottom	93.502	93.533	93.490	93.520	93.502	93.520
Out-of-round	0.008	0.015	0.030	0.017	0.018	0.008
Taper	0.031	0.028	0.016	0.011	0.025	0.035
Connecting Rod Bearings						
Journal Diameter	H 53.919	V 53.922	H 53.924	V 53.929	H 53.912	V 53.914
Shell Diameter	F 54.000	B 53.995	F 53.998	B 53.975	F 53.975	B 53.975
Camshaft Lobe Lift	I 6.20	E 6.07	I 6.20	E 6.20	I 6.20	E 6.20
Valve Stem to Guide Clearance	I 0.036	E 0.038	I 0.038	E 0.041	I 0.038	E 0.036
Valve Spring Force^g	I 240	E 245	I 245	E 240	I 249	E 240
Piston Avg. Diameter	93.477	93.464	93.467	93.449	93.442	93.459
Middle and bottom of skirt						

	No. 1						
	H	V	H	V	H	V	No. 7
Main Bearings							
Journal Diameter	57.104	57.099	57.104	57.099	57.104	57.099	57.099
Shell Diameter	F 57.170	B 57.170	F 57.155	B 57.155	F 57.170	B 57.163	F 57.150

Component		Manufacturer's Service Limits, (mm)	
Compression Ring Gaps			
Top	0.20-0.41	Camshaft Lobe Lift:	
Bottom		Intake	6.22
Cylinder Bore Diameter	93.472-93.594	Exhaust	
Out-of-round	0.13	Valve Stem to Guide Clearance	
Taper	0.25	Intake	0.020-0.064
Connecting Rod Bearings		Exhaust	0.025-0.069
Journal Diameter	53.929-53.950	Valve Spring Force	
Shell Diameter	53.950-53.988	Intake	227-254 (N-m) @ 40.4 mm
		Exhaust	

*L = Longitudinal, T = Transverse, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 g = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
GEORGE AIR FORCE BASE
ENGINE TYPE: DODGE, V-8, 318 CID
VEHICLE NO. 79B2533
TYPE OIL: GREEN

Component	Cylinder No.							
	1	2	3	4	5	6	7	8
Compression Ring								
Caps								
Top	0.028	0.029	0.027	0.030	0.025	0.027	0.025	0.029
Bottom	0.025	0.030	0.027	0.029	0.023	0.027	0.025	0.029
Cylinder Bore								
Diameter								
Top	3.9121	3.9118	3.9117	3.9108	3.9119	3.9113	3.9115	3.9116
Middle	3.9112	3.9118	3.9122	3.9128	3.9120	3.9107	3.9117	3.9121
Bottom	3.9115	3.9120	3.9116	3.9122	3.9128	3.9112	3.9119	3.9121
Out-of-round	0.0003	0.0004	0.0009	0.0001	0.0005	0.0002	0.0001	0.0002
Taper	0.0006	0.0006	0.0005	0.0007	0.0003	0.0009	0.0006	0.0004
Connecting Rod								
Bearings								
Journal Diameter	H 2.1240	V 2.1241	H 2.1239	V 2.1240	H 2.1239	V 2.1240	H 2.1241	V 2.1241
Shell Diameter	F 2.1260	F 2.1258	F 2.1255	F 2.1252	F 2.1255	F 2.1258	F 2.1260	F 2.1258
Camshaft Lobe								
Lift	I 0.243	E 0.245	I 0.235	E 0.254	I 0.239	E 0.257	I 0.235	E 0.253
Valve Stem to								
Guide Clearance	I 0.0017	E 0.0016	I 0.0017	E 0.0017	I 0.0016	E 0.0017	I 0.0018	E 0.0017
Valve Spring								
Force	I 84	E 85	I 84	E 84	I 85	E 85	I 84	E 85
Piston Avg. Diameter								
Middle & bottom	3.9105	3.9108	3.9110	3.9111	3.9095	3.9106	3.9099	3.9109
Main Bearings								
Journal Diameter	H 2.4998	V 2.4995	H 2.4998	V 2.4998	H 2.4998	V 2.4998	H 2.4998	V 2.4996
Shell Diameter	F 2.5005	F 2.5005	F 2.5005	F 2.5005	F 2.5010	F 2.5010	F 2.5018	F 2.5015
Compression Ring Gaps								
Top	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Bottom	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Cylinder Bore Diameter								
Out-of-round	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Taper	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Connecting Rod Bearings								
Journal Diameter	2.1240	2.1241	2.1239	2.1240	2.1239	2.1240	2.1241	2.1241
Shell Diameter	2.1260	2.1258	2.1255	2.1252	2.1255	2.1258	2.1260	2.1258

ENGINE COMPONENTS MEASUREMENTS
GEORGE AIR FORCE BASE
ENGINE TYPE: DODGE, V-8, 318 CID
VEHICLE NO. 79B2533
TYPE OIL: GREEN

Component	1	2	3	4	5	6	7	8
Cylinder No.								
Compression Ring Caps								
Top	0.71	0.74	0.69	0.76	0.64	0.64	0.64	0.74
Bottom	0.64	0.76	0.69	0.74	0.58	0.69	0.64	0.74
Cylinder Bore Diameter								
Top	99.367	99.360	99.370	99.360	99.360	99.367	99.367	99.375
Middle	99.344	99.360	99.354	99.370	99.365	99.357	99.367	99.375
Bottom	99.352	99.365	99.355	99.375	99.370	99.367	99.367	99.375
Out-of-round	0.007	0.010	0.013	0.013	0.013	0.013	0.013	0.013
Taper	0.015	0.015	0.013	0.013	0.013	0.013	0.013	0.013
Connecting Rod Bearings								
Journal Diameter								
Shell Diameter								
Camshaft Lobe Lift								
Valve Stem to Guide Clearance								
Valve Spring Force								
Piston Avg. Diameter Middle & bottom of skirt								
Main Bearings								
Journal Diameter								
Shell Diameter								
Compression Ring Caps								
Top	0.25-0.51							
Bottom								
Cylinder Bore Diameter								
Out-of-round								
Taper								
Connecting Rod Bearings								
Journal Diameter								
Shell Diameter								

H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 † = Measurements are in (in)

ENGINE COMPONENTS MEASUREMENTS
GEORGE AIR FORCE BASE
ENGINE TYPE: DODGE, V-8, 318 CID
VEHICLE NO. 79B2534
TYPE OIL: YELLOW

Component	1	2	3	4	5	6	7	8
Cylinder No.								
Compression Ring Gaps								
Top	0.025	0.024	0.026	0.028	0.024	0.029	0.023	0.027
Bottom	0.025	0.026	0.026	0.026	0.024	0.028	0.026	0.027
Cylinder Bore Diameter								
Top	3.9112	3.9110	3.9105	3.9104	3.9113	3.9104	3.9111	3.9106
Middle	3.9104	3.9109	3.9106	3.9106	3.9116	3.9092	3.9101	3.9096
Bottom	3.9104	3.9109	3.9103	3.9109	3.9116	3.9097	3.9103	3.9104
Out-of-round	0.0002	0.0003	0.0000	0.0000	0.0000	0.0002	0.0005	0.0007
Taper	0.0008	0.0015	0.0006	0.0004	0.0005	0.0007	0.0008	0.0002
Connecting Rod Bearings								
Journal Diameter	H	V	H	V	H	H	V	V
Shell Diameter	F	F	F	F	F	F	F	F
Camshaft Lobe Lift	I	E	I	E	I	I	E	E
Valve Stem to Guide Clearance	I	E	I	E	I	I	E	E
Valve Spring Force	I	E	I	E	I	I	E	E
Piston Avg. Diameter Middle & bottom of skirt	3.9098	3.9101	3.9102	3.9102	3.9103	3.9102	3.9104	3.9100
Main Bearings								
Journal Diameter	H	V	H	V	H	H	V	V
Shell Diameter	F	F	F	F	F	F	F	F
Compression Ring Gaps								
Top	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020
Bottom	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020
Cylinder Bore Diameter	3.9100-3.9120	3.9100-3.9120	3.9100-3.9120	3.9100-3.9120	3.9100-3.9120	3.9100-3.9120	3.9100-3.9120	3.9100-3.9120
Out-of-round	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Taper	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Connecting Rod Bearings								
Journal Diameter	2.1240-2.1250	2.1240-2.1250	2.1240-2.1250	2.1240-2.1250	2.1240-2.1250	2.1240-2.1250	2.1240-2.1250	2.1240-2.1250
Shell Diameter	2.1245-2.1275	2.1245-2.1275	2.1245-2.1275	2.1245-2.1275	2.1245-2.1275	2.1245-2.1275	2.1245-2.1275	2.1245-2.1275

TYPE OIL: YELLOW

Legend: L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
+ = Measurements are in mm
Q = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
GEORGE AIR FORCE BASE
ENGINE TYPE: DODGE, V-8, 318 CID
VEHICLE NO. 79B2539
TYPE OIL: BLUE (C)

Component	Cylinder No.							
	1	2	3	4	5	6	7	8
Compression Ring Caps								
Top		0.026	0.025	0.026	0.025	0.023	0.026	0.025
Bottom		0.026	0.027	0.024	0.027	0.024	0.029	0.023
Cylinder Bore Diameter								
Top	3.9105	3.9118	3.9115	3.9110	3.9113	3.9122	3.9120	3.9118
Middle	3.9105	3.9109	3.9103	3.9101	3.9105	3.9110	3.9114	3.9107
Bottom	3.9107	3.9112	3.9111	3.9106	3.9112	3.9114	3.9119	3.9109
Out-of-round	0.0005	0.0003	0.0001	0.0000	0.0003	0.0002	0.0002	0.0001
Taper	0.0003	0.0007	0.0001	0.0004	0.0003	0.0007	0.0007	0.0007
Connecting Rod Bearings								
Journal Diameter	2.1238	2.1242	2.1238	2.1239	2.1239	2.1238	2.1236	2.1241
Shell Diameter	2.1262	2.1264	2.1265	2.1264	2.1264	2.1265	2.1267	2.1265
Camshaft Lobe Lift	0.234	0.254	0.237	0.251	0.239	0.234	0.247	0.235
Valve Stem to Guide Clearance	0.0019	0.0020	0.0022	0.0020	0.0020	0.0018	0.0019	0.0018
Valve Spring Force	85	84	85	85	84	85	85	84
Piston Avg. Diameter Middle & Bottom of skirt	3.9098	3.9102	3.9095	3.9111	3.9090	3.9101	3.9097	3.9089
Main Bearings								
Journal Diameter	2.4992	2.4990	2.4995	2.4994	2.4995	2.4996	2.4995	2.4993
Shell Diameter	2.5015	2.5017	2.5015	2.5012	2.5019	2.5014	2.5015	2.5018
Compression Ring Caps								
Top		0.010-0.020						
Bottom								
Cylinder Bore Diameter Out-of-round Taper		3.9100-3.9120 0.005 0.010						
Connecting Rod Bearings Journal Diameter Shell Diameter		2.1240-2.1250 2.1245-2.1275						

Manufacturer's Service Limits, Inches

Camshaft Lobe Lift	0.249	
Intake		
Exhaust		
Valve Stem to Guide Clearance	0.001-0.017	
Intake		
Exhaust		
Valve Spring Force	78-88 lb @ 1 1/16"	
Intake		
Exhaust		
Piston Diameter	3.9085-3.9115	
Main Bearings	2.4995-2.5005	
Journal Diameter	2.5000-2.5030	
Shell Diameter		

TYPE OIL: BLUE (C)

ℓ = Longitudinal, T = Transversal, H = Horizontal, V = Vertical.
 F = Forward, B = Back, I = Intake, E = Exhaust
 $\pm$ = Measurements are in mm
 $\pm$ = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
 GRAND FORKS AIR FORCE BASE
 ENGINE TYPE: CHEVROLET, V-8, 350 CID
 VEHICLE NO. 79B1734
 TYPE OIL: YELLOW

Component	Cylinder No.							
	1	2	3	4	5	6	7	8
Compression Ring								
Gaps								
Top	0.021	0.025	0.025	0.024	0.024	0.022	0.024	0.027
Bottom	0.025	0.022	0.025	0.022	0.024	0.022	0.029	0.025
Cylinder Bore								
Diameter	L*	L	L	L	L	L	L	L
Top	4.0015	4.0009	4.0020	4.0018	4.0025	4.0019	4.0022	4.0013
Middle	4.0003	4.0008	4.0004	4.0015	4.0004	4.0013	4.0005	4.0011
Bottom	4.0006	4.0010	4.0006	4.0012	4.0008	4.0016	4.0009	4.0013
Out-of-round	0.0006	0.0002	0.0006	0.0001	0.0009	0.0004	0.0003	0.0004
Taper	0.0009	0.0014	0.0017	0.0014	0.0011	0.0012	0.0013	0.0009
Connecting Rod Bearings								
Journal Diameter	H	V	H	V	H	V	H	V
3.9986	2.0995	2.0995	2.0990	2.0995	2.0995	2.0995	2.0990	2.0990
Shell Diameter	F	B	F	B	F	B	F	B
2.1025	2.1020	2.1025	2.1020	2.1024	2.1020	2.1022	2.1018	2.1025
Camshaft Lobe Lift								
I	E	I	E	I	E	I	E	I
0.261	0.276	0.258	0.266	0.271	0.259	0.263	0.266	0.265
Valve Stem to Guide Clearance								
I	E	I	E	I	E	I	E	I
0.0012	0.0015	0.0015	0.0016	0.0014	0.0016	0.0017	0.0016	0.0016
Valve Spring Force								
I	E	I	E	I	E	I	E	I
76	78	79	75	76	77	78	76	77
Piston Avg. Diameter Middle & bottom of skirt								
3.9988	3.9989	3.9989	3.9989	3.9994	3.9992	3.9989	3.9994	3.9983
Main Bearings								
Journal Diameter	No. 1	No. 2	No. 3	No. 4	No. 5			
H	V	H	V	H	V	H	V	
2.4485	2.4485	2.4480	2.4480	2.4485	2.4484	2.4488	2.4486	
Shell Diameter	F	F	F	F	B	F	B	
2.4524	2.4523	2.4522	2.4522	2.4515	2.4520	2.4520	2.4520	
Compression Ring Gaps								
Top	0.010-0.035							
Bottom		0.258-0.262						
Cylinder Bore Diameter Out-of-round Taper								
3.9995-4.0025								
0.002								
0.001								
Connecting Rod Bearings Journal Diameter Shell Diameter								
2.0998-2.0998								
2.1001-2.1033								

Manufacturer's Service Limits, Inches

Compression Ring Gaps		Camshaft Lobe Lift		Piston Diameter	
Top	0.010-0.035	Intake	0.258-0.262	Main Bearings	3.9968-4.0018
Bottom		Exhaust		Journal Diameter	2.4479-2.4493
Cylinder Bore Diameter		Valve Stem to Guide Clearance		Shell Diameter	2.4504-2.4528
Out-of-round	3.9995-4.0025	Intake	0.0010-0.0017		
Taper	0.002	Exhaust			
Connecting Rod Bearings		Valve Spring Force			
Journal Diameter	2.0998-2.0998	Intake	76-84 lb @ 1.70"		
Shell Diameter	2.1001-2.1033	Exhaust			

ENGINE COMPONENTS MEASUREMENTS
GRAND FORKS AIR FORCE BASE
ENGINE TYPE: CHEVROLET, V-8, 350 CID
VEHICLE NO. 79B1734
TYPE OIL: YELLOW

Component	1	2	3	4	5	6	7	8
Cylinder No.								
Compression Ring Gaps								
Top	0.53	0.64	0.64	0.61	0.61	0.66	0.61	0.69
Bottom	0.64	0.56	0.64	0.56	0.61	0.56	0.74	0.64
Cylinder Bore Diameter								
Top	101.638	101.651	101.646	101.656	101.651	101.628	101.661	101.648
Middle	101.608	101.610	101.638	101.610	101.615	101.618	101.633	101.613
Bottom	101.615	101.625	101.630	101.620	101.636	101.620	101.641	101.628
Out-of-round	0.015	0.005	0.016	0.003	0.023	0.010	0.008	0.010
Taper	0.023	0.036	0.044	0.036	0.028	0.030	0.033	0.023
Connecting Rod Bearings								
Journal Diameter								
Shell Diameter								
Camshaft Lobe Lift								
Valve Stem to Guide Clearance								
Valve Spring Force								
Piston Avg. Diameter Middle & bottom of skirt								
Main Bearings								
Journal Diameter								
Shell Diameter								
Compression Ring Gaps								
Top	0.25-0.89							
Bottom								
Cylinder Bore Diameter								
Out-of-round								
Taper								
Connecting Rod Bearings								
Journal Diameter								
Shell Diameter								

101.570 101.572 101.572 101.585 101.580 101.572 101.585 101.557

62.192 62.192 62.179 62.179 62.192 62.194 62.192 62.192

62.291 62.288 62.286 62.286 62.268 62.281 62.278 62.276

101.570 101.572 101.572 101.585 101.580 101.572 101.585 101.557

62.192 62.192 62.179 62.179 62.192 62.194 62.192 62.192

62.291 62.288 62.286 62.286 62.268 62.281 62.278 62.276

101.570 101.572 101.572 101.585 101.580 101.572 101.585 101.557

62.192 62.192 62.179 62.179 62.192 62.194 62.192 62.192

62.291 62.288 62.286 62.286 62.268 62.281 62.278 62.276

101.519-101.646

Main Bearings
Journal Diameter
Shell Diameter

62.177-62.212
62.240-62.301

6.55-6.65

0.025-0.094

101.572 N-mm (4.3.2 mm)

Camshaft Lobe Lift

Intake
Exhaust

Valve Stem to Guide Clearance

Intake
Exhaust

Valve Spring Force

Intake
Exhaust

53.310-53.335

53.343-53.424

51 = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
* = Measurements are in mm
= Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
GRAND FORKS AIR FORCE BASE
ENGINE TYPE: CHEVROLET, V-8, 350 CID
VEHICLE NO. 79B1735
TYPE OIL: BLUE (B)

Component	Cylinder No.							
	1	2	3	4	5	6	7	8
Compression Ring								
Caps								
Top	0.022	0.024	0.028	0.024	0.022	0.022	0.025	0.025
Bottom	0.026	0.025	0.024	0.027	0.025	0.025	0.026	0.028
Cylinder Bore								
Diameter	L 4.0013	L 4.0015	L 4.0018	L 4.0017	L 4.0015	L 4.0013	L 4.0010	L 4.0013
Top	4.0006	4.0009	4.0009	4.0009	4.0011	4.0014	4.0010	4.0006
Middle	4.0012	4.0015	4.0004	4.0010	4.0013	4.0011	4.0014	4.0013
Bottom	4.0008	4.0009	4.0013	4.0016	4.0010	4.0008	4.0012	4.0013
Out-of-round	0.0007	0.0006	0.0009	0.0011	0.0012	0.0008	0.0004	0.0011
Taper	0.0005	0.0006	0.0008	0.0006	0.0003	0.0003	0.0002	0.0002
Connecting Rod								
Bearings								
Journal Diameter	H 2.0984	H 2.0989	H 2.0986	H 2.0989	H 2.0988	H 2.0988	H 2.0985	H 2.0986
Shell Diameter	F 2.1018	F 2.1014	F 2.1012	F 2.1014	F 2.1017	F 2.1010	F 2.1012	F 2.1018
Camshaft Lobe								
Lift	I 0.261	I 0.270	I 0.259	I 0.269	I 0.257	I 0.273	I 0.270	I 0.257
Valve Stem to Guide Clearance								
Valve Spring Force	I 0.0014	I 0.0015	I 0.0016	I 0.0015	I 0.0014	I 0.0016	I 0.0015	I 0.0014
Piston Avg. Diameter								
Middle & Bottom of skirt	4.0002	3.9998	3.9989	3.9994	3.9999	4.0002	3.9998	3.9911
Main Bearings								
Journal Diameter	H 2.4392	H 2.4399	H 2.4392	H 2.4399	H 2.4389	H 2.4386	H 2.4384	H 2.4382
Shell Diameter	F 2.4506	F 2.4506	F 2.4506	F 2.4505	F 2.4505	F 2.4506	F 2.4506	F 2.4500
Compression Ring Caps								
Top	0.010-0.035							
Bottom								
Cylinder Bore Diameter								
Out-of-round	3.9995-4.0025							
Taper	0.002							
Connecting Rod Bearings								
Journal Diameter	2.0988-2.0998							
Shell Diameter	2.1001-2.1033							

Manufacturer's Service Limits, Inches

Compression Ring Caps								
Top	0.010-0.035							
Bottom								
Cylinder Bore Diameter								
Out-of-round	3.9995-4.0025							
Taper	0.002							
Connecting Rod Bearings								
Journal Diameter	2.0988-2.0998							
Shell Diameter	2.1001-2.1033							
Camshaft Lobe Lift								
Intake	0.258-0.262							
Exhaust								
Valve Stem to Guide Clearance								
Intake	0.0010-0.0037							
Exhaust								
Valve Spring Force								
Intake	76-84 lb @ 1.70"							
Exhaust								
Piston Diameter								
Main Bearings	3.9968-4.0018							
Journal Diameter	2.4479-2.4493							
Shell Diameter	2.4504-2.4528							

ENGINE COMPONENTS MEASUREMENTS
 GRAND FORKS AIR FORCE BASE
 ENGINE TYPE: CHEVROLET, V-8, 350 CID
 VEHICLE NO. 7981735
 TYPE OIL: BLUE (B)

Component	Cylinder No.							
	1	2	3	4	5	6	7	8
Compression Ring								
Caps								
Top	0.56*	0.61	0.71	0.61	0.56	0.56	0.64	0.64
Bottom	0.66	0.64	0.61	0.69	0.64	0.64	0.66	0.71
Cylinder Bore								
Diameter								
Top	101.633	101.615	101.638	101.623	101.646	101.623	101.638	101.633
Middle	101.615	101.630	101.638	101.610	101.610	101.633	101.625	101.613
Bottom	101.620	101.636	101.633	101.625	101.633	101.625	101.630	101.630
Out-of-round	0.018	0.015	0.023	0.015	0.015	0.008	0.010	0.005
Taper	0.013	0.015	0.021	0.015	0.008	0.013	0.005	0.005
Connecting Rod								
Bearings								
Journal Diameter	H	V	H	V	H	V	H	V
Shell Diameter	53.299	53.312	53.315	53.304	53.310	53.312	53.310	53.302
Camshaft Lobe	I	E	I	E	I	E	I	E
Lift	6.63	6.86	6.58	6.83	6.91	6.58	6.86	6.93
Valve Stem to Guide Clearance	I	E	I	E	I	E	I	E
Valve Spring Force	347	334	334	329	347	334	329	334
Piston Avg. Diameter	101.615	101.595	101.572	101.585	101.575	101.615	101.595	101.574
Main Bearings								
Journal Diameter	H	V	H	V	H	V	H	V
Shell Diameter	62.210	62.202	62.200	62.202	62.200	62.200	62.194	62.184
Compression Ring Caps	Top	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89
Cylinder Bore Diameter	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664
Connecting Rod Bearings	Journal Diameter	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335
Shell Diameter	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424

* L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical.
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 d = Measurements are in N-m

ENGINE COMPONENTS MEASUREMENTS

HANCOCK AIR FORCE BASE

ENGINE TYPE: PLYMOUTH, 6 CYLINDER, 225 CID

VEHICLE NO. 78B5038

TYPE OIL: GREEN

[illegible]

ENGINE COMPONENTS MEASUREMENTS
HANCOCK AIR FORCE BASE
ENGINE TYPE: PLYMOUTH, 6 CYLINDER, 225 CID
VEHICLE NO. 78B5038
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	1.60 ⁺	0.53	1.22	0.61	1.37	1.68
Bottom	0.89	0.74	0.76	0.79	0.97	0.99
Cylinder Bore Diameter						
Top	L	L	T	L	T	T
Middle	86.390	86.385	86.383	86.386	86.378	86.396
Bottom	86.390	86.373	86.375	86.385	86.385	86.413
Out-of-round	86.396	86.378	86.378	86.418	86.408	86.396
Taper	0.013	0.003	0.020	0.005	0.025	0.008
	0.005	0.008	0.003	0.008	0.010	0.005
Connecting Rod Bearings						
Journal Diameter	H	V	V	H	V	V
Shell Diameter	55.550	55.547	55.550	55.547	55.550	55.547
	F	F	F	F	F	F
	55.606	55.625	55.606	56.210	55.601	55.641
	I	E	E	I	E	E
	6.30	7.01	7.14	6.07	6.73	6.83
Camshaft Lobe Lift	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine
Valve Stem to Guide Clearance	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine
Valve Spring Force[§]	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine
Piston Avg. Diameter	86.355	86.350	86.370	86.352	86.352	86.355
Main Bearings						
Journal Diameter	No. 1	No. 2	No. 3	No. 4	No. 4	No. 4
	H	H	H	H	H	H
	69.847	69.840	69.845	69.845	69.850	69.850
	F	F	F	F	F	F
	69.896	69.880	69.888	69.880	69.888	69.906
Shell Diameter						
	I	E	E	I	E	E
	6.30	7.01	7.14	6.07	6.73	6.83
Compression Ring Gaps						
Top	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19
Bottom	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19
Cylinder Bore Diameter						
Top	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411
Bottom	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411
Out-of-round	0.13	0.13	0.13	0.13	0.13	0.13
Taper	0.25	0.25	0.25	0.25	0.25	0.25
Connecting Rod Bearings						
Journal Diameter	55.537-55.563	55.537-55.563	55.537-55.563	55.537-55.563	55.537-55.563	55.537-55.563
Shell Diameter	55.550-55.626	55.550-55.626	55.550-55.626	55.550-55.626	55.550-55.626	55.550-55.626
Manufacturer's Service Limits, (mm)						
Camshaft Lobe Lift	6.88	6.88	6.88	6.88	6.88	6.88
Intake						
Exhaust						
Valve Stem to Guide Clearance	0.025-0.43	0.025-0.43	0.025-0.43	0.025-0.43	0.025-0.43	0.025-0.43
Intake						
Exhaust						
Valve Spring Force	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm
Intake						
Exhaust						
Manufacturer's Service Limits, (mm)						
Camshaft Lobe Lift	6.88	6.88	6.88	6.88	6.88	6.88
Intake						
Exhaust						
Valve Stem to Guide Clearance	0.025-0.43	0.025-0.43	0.025-0.43	0.025-0.43	0.025-0.43	0.025-0.43
Intake						
Exhaust						
Valve Spring Force	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm	218-254 N-m @ 42.86 mm
Intake						
Exhaust						

L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
⁺ = Measurements are in mm
[§] = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
 HANCOCK AIR FORCE BASE
 ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
 VEHICLE NO. 78B5646
 TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	0.024	0.026	0.027	0.024	0.027	0.028
Bottom	0.029	0.028	0.024	0.029	0.026	0.022
Cylinder Bore Diameter						
Top	L* 4.0024	L 4.0028	L 4.0036	T 4.0028	L 4.0031	T 4.0032
Middle	4.0017	4.0020	4.0028	4.0024	4.0019	4.0018
Bottom	4.0020	4.0025	4.0030	4.0024	4.0021	4.0020
Out-of-round	0.0007	0.0008	0.0008	0.0009	0.0013	0.0006
Taper	0.0004	0.0003	0.0023	0.0010	0.0001	0.0012
Connecting Rod Bearings						
Journal Diameter	H 2.1223	H 2.1222	H 2.1223	V 2.1222	H 2.1223	V 2.1223
Shell Diameter	F 2.1265	F 2.1271	F 2.1270	B 2.1270	F 2.1267	B 2.1266
Camshaft Lobe Lift	I 0.242	I 0.238	I 0.225	E 0.244	I 0.231	E 0.233
Valve Stem to Guide Clearance	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine
Valve Spring Force	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine	No head on engine
Piston Avg. Diameter	3.9992	3.9995	3.9990	3.9991	3.9990	3.9995
Middle and bottom of skirt						
Main Bearings						
Journal Diameter	No. 1 H 2.3984	No. 2 H 2.3984	No. 3 H 2.3984	No. 4 H 2.3984	No. 5 H 2.3984	No. 6 H 2.3984
Shell Diameter	F 2.4019	F 2.4018	F 2.4019	F 2.4018	F 2.4018	F 2.4019
Compression Ring Caps						
Top	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020
Bottom	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048
Cylinder Bore Diameter	0.005	0.005	0.005	0.005	0.005	0.005
Out-of-round	0.010	0.010	0.010	0.010	0.010	0.010
Taper	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236
Connecting Rod Bearings						
Journal Diameter	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260
Shell Diameter						

Manufacturer's Service Limits, Inches

3.9946-4.0002
 2.3982-2.3990
 2.3990-2.4014

Piston Diameter
 Main Bearings
 Journal Diameter
 Shell Diameter

0.244-0.249
 0.0010-0.0055
 68.4-84 lbs. @ 1.7"

Camshaft Lobe Lift
 Intake
 Exhaust
 Valve Stem to Guide Clearance
 Intake
 Exhaust
 Valve Spring Force
 Intake
 Exhaust

ENGINE COMPONENTS MEASUREMENTS
HANCOCK AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
VEHICLE NO. 78B5646
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.61 ⁺	0.66	0.69	0.61	0.69	0.71
Bottom	0.74	0.71	0.61	0.74	0.66	0.56
Cylinder Bore Diameter						
Top	L 101.661	L 101.671	L 101.691	L 101.679	L 101.636	L 101.681
Middle	T 101.643	T 101.651	T 101.671	T 101.661	T 101.669	T 101.666
Bottom	L 101.651	L 101.664	L 101.633	L 101.653	L 101.643	L 101.646
Out-of-round	0.018	0.020	0.020	0.023	0.033	0.015
Taper	0.010	0.008	0.008	0.025	0.003	0.030
Connecting Rod Bearings						
Journal Diameter	H 53.906	H 53.904	H 53.906	H 53.904	H 53.906	H 53.906
Shell Diameter	F 54.013	F 54.028	F 54.026	F 54.016	F 54.018	F 54.016
Camshaft Lobe Lift	I 6.15	I 6.05	I 6.15	I 6.20	I 5.54	I 5.97
Valve Stem to Guide Clearance	No head on engine					
Valve Spring Force ^g	No head on engine					
Piston Avg. Diameter	101.580	101.587	101.575	101.577	101.575	101.587
Middle and bottom of skirt						
Main Bearings						
Journal Diameter	H 60.919	H 60.919	H 60.919	H 60.919	H 60.919	H 60.919
Shell Diameter	F 61.008	F 61.006	F 61.008	F 61.006	F 61.006	F 61.008
Compression Ring Gaps						
Top	0.25-0.51					
Bottom						
Cylinder Bore Diameter	101.600-101.722					
Out-of-round	0.13					
Taper	0.25					
Connecting Rod Bearings						
Journal Diameter	53.919-53.939					
Shell Diameter	53.937-54.000					
Manufacturer's Service Limits, (mm)						
Camshaft Lobe Lift	Intake	6.20-6.32	Piston Diameter	101.463-101.605		
Exhaust	Valve Stem to Guide Clearance	0.025-0.140	Main Bearings	60.914-60.935		
Valve Spring Force	Intake	30.4-37.4 N-m @ 43.2 mm	Journal Diameter	60.935-60.996		
Exhaust			Shell Diameter			

L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
⁺ = Measurements are in mm
^g = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
LACKLAND AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
VEHICLE NO. 79B2270
TYPE OIL: YELLOW

Component	Cylinder No.											
	1	2	3	4	5	6						
Compression Ring Gaps												
Top	0.055	0.045	0.035	0.037	0.040	0.050						
Bottom	0.044	0.037	0.037		0.042	0.050						
Cylinder Bore Diameter												
Top	L* 4.0049	L 4.0026	T 4.0025	L 4.0020	T 4.0018	L 4.0019	T 4.0018	L 4.0017	T 4.0016	L 4.0015	T 4.0014	L 4.0013
Middle	4.0021	4.0009	4.0022	4.0002	4.0007	4.0008	4.0008	4.0001	4.0002	4.0003	4.0004	4.0005
Bottom	4.0014	4.0007	4.0010	4.0003	4.0001	4.0002	4.0001	0.0001	0.0002	0.0001	0.0002	0.0003
Out-of-round	0.0001	0.0001	0.0008	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Taper	0.0035	0.0019	0.0019	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017
Connecting Rod Bearings												
Journal Diameter	H 2.1242	H 2.1225	V 2.1225	H 2.1225	V 2.1226	H 2.1226	V 2.1228	H 2.1226	V 2.1228	H 2.1226	V 2.1226	
Shell Diameter	F 2.1255	F 2.1254	F 2.1250	F 2.1253	F 2.1258	F 2.1255	F 2.1252	F 2.1250	F 2.1252	F 2.1250	F 2.1252	
Camshaft Lobe Lift	I 0.250	I 0.245	E 0.248	I 0.249	E 0.252	I 0.237	E 0.245	I 0.251	E 0.238	I 0.251	E 0.238	
Valve Stem to Guide Clearance	I 0.0019	I 0.0016	E 0.0017	I 0.0017	E 0.0018	I 0.0017	E 0.0017	I 0.0018	E 0.0017	I 0.0018	E 0.0017	
Valve Spring Force	I 80	I 80	E 80	I 79	E 80	I 80	E 79	I 80	E 79	I 79	E 80	
Piston Avg. Diameter	3.9991	3.9989	3.9996	3.9986	3.9982	3.9992	3.9982	3.9992	3.9982	3.9992	3.9982	
Middle and bottom of skirt												
Main Bearings												
Journal Diameter	H 2.3984	V 2.3980	H 2.3980	V 2.3986	H 2.3984	V 2.3980	H 2.3982	V 2.3983	H 2.3986	V 2.3985		
Shell Diameter	F 2.3999	F 2.3999	F 2.3998	F 2.4002	F 2.4001	F 2.4004	F 2.4009	F 2.4003	F 2.4004	F 2.4005	F 2.4002	
Compression Ring Gaps												
Top	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	
Bottom	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	
Cylinder Bore Diameter	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
Out-of-round	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	
Taper	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	
Connecting Rod Bearings												
Journal Diameter	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	
Shell Diameter												

Manufacturer's Service Limits, Inches

Piston Diameter
Main Bearings
Journal Diameter
Shell Diameter
3.9946-4.0002
2.3982-2.3990
2.3990-2.4014

Camshaft Lobe Lift
Intake
Exhaust
Valve Stem to Guide Clearance
Intake
Exhaust
Valve Spring Force
Intake
Exhaust
0.244-0.249
0.0010-0.0055
68.4-84 lbs. at 1.7"

ENGINE COMPONENTS MEASUREMENTS
LACKLAND AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 C.I.D.
VEHICLE NO. 79B2270
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	1.40*	1.14	0.89	0.94	1.02	1.27
Bottom	1.12	0.94	0.94		1.07	1.27
Cylinder Bore Diameter						
Top	101.724	101.727	101.664	101.646	101.646	101.699
Middle	101.653	101.666	101.623	101.653	101.646	101.740
Bottom	101.684	101.623	101.636	101.605	101.618	101.638
Out-of-round	101.636	101.618	101.625	101.628	101.603	101.635
Taper	0.003	0.003	0.020	0.005	0.003	0.041
	0.089	0.048	0.048	0.043	0.043	0.094
Connecting Rod Bearings						
Journal Diameter						
Shell Diameter						
Camshaft Lobe Lift						
Valve Stem to Guide Clearance						
Valve Spring Force ^g						
Piston Avg. Diameter						
Middle and bottom of skirt	101.577	101.572	101.590	101.564	101.554	101.580

Main Bearings	Manufacturer's Service Limits, (mm)						
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Journal Diameter	H 60.919	H 60.909	H 60.924	H 60.919	H 60.909	H 60.914	H 60.917
Shell Diameter	F 60.957	F 60.955	F 60.965	F 60.963	F 60.963	F 60.968	F 60.970

Compression Ring Caps	Manufacturer's Service Limits, (mm)						
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Top	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51
Bottom	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Cylinder Bore Diameter	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722
Out-of-round	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Taper	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Connecting Rod Bearings							
Journal Diameter	51.919-53.939	51.919-53.939	51.919-53.939	51.919-53.939	51.919-53.939	51.919-53.939	51.919-53.939
Shell Diameter	51.937-54.000	51.937-54.000	51.937-54.000	51.937-54.000	51.937-54.000	51.937-54.000	51.937-54.000

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, S = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 g = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
LACKLAND AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
VEHICLE NO. 79B2271
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.067	0.055	0.060	0.058	0.073	0.090
Bottom	0.055	0.069	0.045	0.059	0.079	0.079
Cylinder Bore Diameter						
Top	L* 4.0033	L 4.0030	T 4.0040	L 4.0036	T 4.0039	T 3.9986
Middle	4.0017	4.0022	4.0030	4.0021	4.0027	4.0049
Bottom	4.0005	4.0011	4.0013	4.0010	4.0015	4.0026
Out-of-round	0.0012	0.0010	0.0007	0.0013	0.0008	0.0015
Taper	0.0028	0.0017	0.0015	0.0023	0.0031	0.0030
Connecting Rod Bearings						
Journal Diameter	H 2.1222	H 2.1228	V 2.1229	H 2.1224	H 2.1221	H 2.1227
Shell Diameter	F 2.1260	F 2.1253	B 2.1254	F 2.1253	F 2.1251	F 2.1252
Camshaft Lobe Lift	I 0.246	I 0.244	E 0.246	I 0.248	I 0.243	I 0.245
Valve Stem to Guide Clearance	I 0.0024	I 0.0020	E 0.0022	I 0.0022	I 0.0019	I 0.0020
Valve Spring Force	I 78	I 80	E 79	I 79	I 80	I 81
Piston Avg. Diameter	3.9997	4.0001	3.9991	3.9999	3.9998	4.0012
Middle and bottom of skirt						
Main Bearings						
Journal Diameter	H 2.3986	V 2.3987	H 2.3988	V 2.3985	H 2.3980	V 2.3982
Shell Diameter	F 2.4008	B 2.4002	F 2.4009	B 2.4003	F 2.4004	B 2.4009
Compression Ring Gaps						
Top	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020	0.010-0.020
Bottom	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048	4.0000-4.0048
Cylinder Bore Diameter	0.005	0.005	0.005	0.005	0.005	0.005
Out-of-round	0.010	0.010	0.010	0.010	0.010	0.010
Taper	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236	2.1228-2.1236
Connecting Rod Bearings						
Journal Diameter	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260	2.1235-2.1260
Shell Diameter						

Manufacturer's Service Limits, Inches

Piston Diameter
Main Bearings
Journal Diameter
Shell Diameter
3.9946-4.0002
2.3982-2.3990
2.3990-2.4014

Camshaft Lobe Lift
Intake
Exhaust
Valve Stem to Guide Clearance
Intake
Exhaust
Valve Spring Force
Intake
Exhaust
0.244-0.249
0.0010-0.0055
68.4-84 lbs. @ 1.7"

ENGINE COMPONENTS MEASUREMENTS
LACKLAND AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
VEHICLE NO. 79B2271
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	1.70*	1.40	1.52	1.47	1.85	2.29
Bottom	1.40	1.75	1.14	1.50	2.01	2.01
Cylinder Bore Diameter						
Top	101.684	101.714	101.676	101.686	101.702	101.686
Middle	101.643	101.664	101.656	101.633	101.659	101.562
Bottom	101.613	101.628	101.676	101.656	101.669	101.564
Out-of-round	0.030	0.026	0.030	0.030	0.013	0.002
Taper	0.071	0.043	0.038	0.058	0.079	0.076
Connecting Rod Bearings						
Journal Diameter						
Shell Diameter	53.904	53.904	53.909	53.904	53.901	53.917
Camshaft Lobe Lift	6.25	6.25	6.25	6.25	6.17	6.30
Valve Stem to Guide Clearance	0.061	0.056	0.056	0.056	0.048	0.051
Valve Spring Force ^a	347	360	351	356	356	360
Piston Avg. Diameter	101.592	101.603	101.577	101.597	101.595	101.630
Main Bearings						
Journal Diameter	60.924	60.927	60.914	60.922	60.909	60.914
Shell Diameter	60.980	60.965	60.983	60.968	60.970	60.983
Compression Ring Caps						
Top	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51	0.25-0.51
Bottom	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722	101.600-101.722
Cylinder Bore Diameter	0.13	0.13	0.13	0.13	0.13	0.13
Out-of-round	0.25	0.25	0.25	0.25	0.25	0.25
Taper	53.919-53.939	53.919-53.939	53.919-53.939	53.919-53.939	53.919-53.939	53.919-53.939
Journal Diameter	53.937-54.000	53.937-54.000	53.937-54.000	53.937-54.000	53.937-54.000	53.937-54.000
Shell Diameter	60.914-60.935	60.914-60.935	60.914-60.935	60.914-60.935	60.914-60.935	60.914-60.935
Manufacturer's Service Limits, (mm)						
Camshaft Lobe Lift	6.20-6.32	6.20-6.32	6.20-6.32	6.20-6.32	6.20-6.32	6.20-6.32
Intake	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140
Exhaust	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140
Valve Stem to Guide Clearance	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140	0.025-0.140
Intake	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm
Exhaust	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm	304-374 (N-m) @ 43.2 mm
Notes:						
L = Longitudinal, T = Transverse, H = Horizontal, V = Vertical,						
F = Forward, B = Back, I = Intake, E = Exhaust						
* = Measurements are in mm						
g = Measurements are in (N-m)						

ENGINE COMPONENTS MEASUREMENTS
LACKLAND AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
VEHICLE NO. 79B2272
TYPE OIL: BLUE (A)

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.035	0.028	0.032	0.029	0.030	0.034
Bottom	0.035	0.030	0.028	0.030	0.032	0.032
Cylinder Bore Diameter						
Top	4.0026	4.0026	4.0027	4.0022	4.0025	4.0024
Middle	4.0019	4.0019	4.0017	4.0015	4.0014	4.0021
Bottom	4.0010	4.0010	4.0012	4.0013	4.0012	4.0012
Out-of-round	4.0012	4.0014	4.0012	4.0013	4.0010	4.0013
Taper	0.0007	0.0006	0.0004	0.0009	0.0001	0.0008
	0.0014	0.0012	0.0015	0.0009	0.0011	0.0007
Connecting Rod Bearings						
Journal Diameter						
Shell Diameter	2.1231	2.1229	2.1228	2.1228	2.1229	2.1233
	H	V	H	V	H	V
	2.1256	2.1255	2.1258	2.1253	2.1250	2.1255
	F	B	F	B	F	B
Camshaft Lobe Lift						
Not measured						
Valve Stem to Guide Clearance						
Valve Spring Force	0.0017	0.0014	0.0015	0.0016	0.0017	0.0013
	I	E	I	E	I	E
	80	80	79	80	79	80
Piston Avg. Diameter						
Middle and bottom of skirt	3.9987	3.9999	3.9999	3.9996	3.9993	3.9992
Main Bearings						
Journal Diameter	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
	H	H	H	H	H	H
	2.3986	2.3986	2.3985	2.3984	2.3988	2.3986
	V	V	V	V	V	V
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4009
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B	B	B	B	B
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	F	F	F	F	F	F
	2.4011	2.4010	2.4010	2.4010	2.4010	2.4010
	B	B				

ENGINE COMPONENTS MEASUREMENTS
LACKLAND AIR FORCE BASE
ENGINE TYPE: FORD, 6 CYLINDER, 300 CID
VEHICLE NO. 79B2272
TYPE OIL: BLUE (A)

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.89 ⁺	0.71	0.81	0.74	0.76	0.86
Bottom	0.89	0.76	0.71	0.76	0.81	0.81
Cylinder Bore Diameter						
Top	L 101.666	T 101.666	L 101.669	T 101.656	L 101.664	T 101.671
Middle	101.625	101.648	101.625	101.638	101.636	101.630
Bottom	101.630	101.638	101.630	101.633	101.625	101.620
Out-of-round	0.018	0.015	0.011	0.023	0.003	0.018
Taper	0.036	0.030	0.039	0.023	0.028	0.033
Connecting Rod Bearings						
Journal Diameter	H 53.927	V 53.922	H 53.919	V 53.919	H 53.922	V 53.919
Shell Diameter	F 53.990	F 53.988	F 53.980	F 53.983	F 53.975	F 53.975
Camshaft Lobe Lift	Not measured					
Valve Stem to Guide Clearance	I 0.043	E 0.036	I 0.036	E 0.041	I 0.038	E 0.036
Valve Spring Force ^g	I 356	E 356	I 351	E 347	I 351	E 351
Piston Avg. Diameter	101.567	101.575	101.597	101.590	101.582	101.580
Main Bearings						
Journal Diameter	H 60.924	V 60.930	H 60.920	V 60.919	H 60.924	V 60.917
Shell Diameter	F 60.988	F 60.985	F 60.985	F 60.988	F 60.985	F 60.983
Compression Ring Gaps						
Top	0.25-0.51	Camshaft Lobe Lift				
Bottom	101.600-101.722	Intake				
Cylinder Bore Diameter	0.13	Exhaust				
Out-of-round	0.25	Valve Stem to Guide Clearance				
Taper	53.919-53.939	Intake				
Connecting Rod Bearings	53.937-54.000	Exhaust				
Journal Diameter		Valve Spring Force				
Shell Diameter		Intake				

Manufacturers Service Limits, (mm)

Piston Diameter 101.463-101.605
Main Bearings 60.914-60.935
Journal Diameter 60.935-60.996
Shell Diameter

^aL = Longitudinal, T = Transversal, H = Horizontal, V = Vertical.
F = Forward, B = Back, I = Intake, E = Exhaust
⁺ = Measurements are in mm
^g = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
MINOT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, V-8, 350 CID
VEHICLE NO. 79B1736
TYPE OIL: GREEN

Component	1	2	3	4	5	6	7	8
Cylinder No.								
Compression Ring								
Gaps								
Top	0.024	0.022	0.022	0.024	0.021	No rings	0.026	No rings
Bottom	0.022	0.030	0.022	0.030	0.022	No rings	0.020	No rings
Cylinder Bore								
Diameter								
Top	4.0027	4.0018	4.0020	4.0006	4.0017	4.0020	4.0015	4.0014
Middle	4.0005	4.0012	4.0000	4.0005	4.0011	4.0005	4.0005	4.0008
Bottom	4.0009	4.0014	4.0003	4.0006	4.0015	4.0008	4.0012	4.0013
Out-of-round	0.0009	0.0006	0.0014	0.0002	0.0014	0.0002	0.0000	0.0007
Taper	0.0018	0.0019	0.0017	0.0011	0.0026	0.0011	0.0003	0.0013
Connecting Rod								
Bearings								
Journal Diameter	2.0992	2.0989	2.0992	2.0990	2.0990	2.0988	2.0988	2.0984
Shell Diameter	2.1018	2.1025	2.1020	2.1020	2.1018	2.1029	2.1019	2.1025
Camshaft Lobe								
Lift	0.259	0.270	0.269	0.270	0.258	0.270	0.267	0.267
Valve Stem to								
Guide Clearance	0.0012	0.0015	0.0013	0.0015	0.0014	0.0013	0.0014	0.0013
Valve Spring								
Force	74	71	75	73	76	77	74	75
Piston Avg. Diameter								
Middle & bottom	4.0001	3.9980	3.9995	3.9986	3.9992	3.9995	3.9985	3.9995
Main Bearings								
Journal Diameter	2.4488	2.4482	2.4488	2.4486	2.4488	2.4488	2.4488	2.4485
Shell Diameter	2.4510	2.4515	2.4510	2.4514	2.4515	2.4515	2.4515	2.4515
Manufacturer's Service Limits, Inches								
Compression Ring Gaps								
Top	0.010-0.035							
Bottom								
Cylinder Bore Diameter								
Out-of-round	3.9995-4.0025							
Taper	0.002							
Connecting Rod Bearings								
Journal Diameter	2.0988-2.0998							
Shell Diameter	2.1001-2.1033							
Piston Diameter								
Main Bearings	3.9968-4.0018							
Journal Diameter	2.4479-2.4493							
Shell Diameter	2.4504-2.4528							
Camshaft Lobe Lift								
Intake	0.258-0.262							
Exhaust								
Valve Stem to Guide Clearance								
Intake	0.0010-0.0037							
Exhaust								
Valve Spring Force								
Intake	78-84 lb @ 170"							
Exhaust								

ENGINE COMPONENTS MEASUREMENTS
MINOT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, V-8, 350 CID
VEHICLE NO. 79B1736
TYPE OIL: GREEN

Component	1	2	3	4	5	6	7	8
Cylinder No.								
Compression R...								
Gaps								
Top	0.61*	0.56	0.56	0.61	0.53	No rings	0.66	No rings
Bottom	0.56	0.76	0.56	0.76	0.56	No rings	0.51	No rings
Cylinder Bore								
Diameter								
Top	L 101.669	T 101.646	L 101.661	T 101.646	L 101.651	T 101.646	L 101.651	T 101.646
Middle	101.613	101.630	101.600	101.628	101.610	101.628	101.613	101.630
Bottom	101.623	101.636	101.613	101.615	101.620	101.618	101.623	101.630
Out-of-round	0.023	0.015	0.036	0.005	0.035	0.005	0.000	0.017
Taper	0.046	0.048	0.043	0.028	0.066	0.028	0.008	0.033
Connecting Rod								
Bearings								
Journal Diameter	B 53.320	V 53.320	H 53.327	V 53.325	H 53.315	V 53.310	H 53.310	V 53.299
Shell Diameter	F 53.386	B 53.404	F 53.391	B 53.391	F 53.386	B 53.404	F 53.388	B 53.404
Camshaft Lobe								
Lift	I 6.58	E 6.86	I 6.83	E 6.63	I 6.86	E 6.19	I 6.78	E 6.60
Valve Stem to								
Guide Clearance	I 0.030	E 0.038	I 0.033	E 0.038	I 0.038	E 0.036	I 0.041	E 0.036
Valve Spring								
Force	I 329	E 316	I 334	E 325	I 343	E 343	I 338	E 329
Piston Avg. Diameter								
Middle & bottom	101.603	101.549	101.587	101.564	101.580	101.587	101.562	101.587
Main Bearings								
Journal Diameter	No. 1	No. 2	No. 3	No. 4	No. 5			
Shell Diameter	H 62.200	V 62.184	H 62.200	V 62.200	H 62.200	V 62.200	H 62.200	V 62.192
Compression Ring Gaps								
Top	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89	0.25-0.89
Bottom	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051
Cylinder Bore Diameter	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664	101.587-101.664
Out-of-round	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051
Taper	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Connecting Rod Bearings								
Journal Diameter	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335	53.310-53.335
Shell Diameter	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424	53.343-53.424

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical.
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 @ = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
MINOT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, V-8, 350 CID
VEHICLE NO. 79B1759
TYPE OIL: BLUE (C)

Component	Cylinder No.							
	1	2	3	4	5	6	7	8
Compression Ring								
Caps								
Top	0.029	0.031	0.030	0.030	0.028	0.036	0.028	0.030
Bottom	0.028	0.028	0.026	0.028	0.025	0.028	0.022	0.030
Cylinder Bore								
Diameter								
Top	4.0023	4.0018	4.0025	4.0013	4.0021	4.0018	4.0012	4.0010
Middle	4.0007	4.0013	4.0003	4.0010	4.0015	4.0013	4.0008	4.0014
Bottom	4.0006	4.0014	4.0007	4.0009	4.0015	4.0014	4.0008	4.0004
Out-of-round	0.0005	0.0007	0.0003	0.0004	0.0006	0.0009	0.0002	0.0001
Taper	0.0017	0.0018	0.0013	0.0021	0.0006	0.0016	0.0003	0.0006
Connecting Rod								
Bearings								
Journal Diameter								
Shell Diameter								
Camshaft Lobe								
Lift								
Valve Stem to								
Guide Clearance								
Valve Spring								
Force								
Piston Avg. Diameter								
Middle & bottom								
of skirt								
Main Bearings								
Journal Diameter								
Shell Diameter								
Compression Ring								
Caps								
Top								
Bottom								
Cylinder Bore								
Diameter								
Out-of-round								
Taper								
Connecting Rod								
Bearings								
Journal Diameter								
Shell Diameter								

ENGINE COMPONENTS MEASUREMENTS
MINOT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, V-8, 350 CID
VEHICLE NO. 79B1759
TYPE OIL: BLUE (C)

Component	1	2	3	4	5	6	7	8
Cylinder No.								
Compression Ring								
Caps								
Top	0.74*	0.79	0.76	0.71	0.91	0.71	0.71	0.76
Bottom	0.71	0.71	0.66	0.71	0.71	0.56	0.71	0.76
Cylinder Bore								
Diameter								
Top	101.638	101.646	101.641	101.633	101.663	101.661	101.630	101.625
Middle	101.618	101.633	101.633	101.633	101.633	101.633	101.610	101.636
Bottom	101.615	101.636	101.618	101.633	101.633	101.613	101.620	101.610
Out-of-round	0.012	0.018	0.008	0.010	0.015	0.023	0.005	0.003
Taper	0.043	0.046	0.033	0.053	0.015	0.040	0.007	0.015
Connecting Rod								
Bearings								
Journal Diameter								
H	53.284	53.289	53.284	53.284	53.289	53.284	53.302	53.302
V	53.284	53.277	53.284	53.292	53.284	53.284	53.302	53.302
F	53.327	53.337	53.348	53.345	53.337	53.345	53.355	53.350
B	53.327	53.337	53.348	53.345	53.337	53.345	53.355	53.350
Shell Diameter								
H	53.327	53.337	53.348	53.345	53.337	53.345	53.355	53.350
V	53.327	53.337	53.348	53.345	53.337	53.345	53.355	53.350
F	53.327	53.337	53.348	53.345	53.337	53.345	53.355	53.350
B	53.327	53.337	53.348	53.345	53.337	53.345	53.355	53.350
Camshaft Lobe								
Lift	6.55	6.88	1.78	6.88	6.58	6.81	6.55	6.81
Valve Stem to								
Guide Clearance	0.051	0.048	0.053	0.053	0.048	0.043	0.043	0.051
Valve Spring								
Force	316	316	325	325	325	325	325	325
Piston Avg. Diameter								
Middle & Bottom	101.608	101.608	101.577	101.587	101.575	101.600	101.595	101.453
Main Bearings								
Journal Diameter								
H	61.981	61.981	61.976	61.976	61.976	61.976	61.981	61.973
V	61.981	61.981	61.976	61.976	61.976	61.976	61.981	61.973
F	62.065	62.065	62.052	62.057	62.050	62.052	62.057	62.052
B	62.065	62.065	62.052	62.057	62.050	62.052	62.057	62.052
Shell Diameter								
H	62.065	62.065	62.052	62.057	62.050	62.052	62.057	62.052
V	62.065	62.065	62.052	62.057	62.050	62.052	62.057	62.052
F	62.065	62.065	62.052	62.057	62.050	62.052	62.057	62.052
B	62.065	62.065	62.052	62.057	62.050	62.052	62.057	62.052
Compression Ring Caps								
Top	0.25-0.89							
Bottom								
Cylinder Bore Diameter								
Out-of-round	101.587-101.664							
Taper	0.051							
Connecting Rod Bearings								
Journal Diameter	53.310-53.335							
Shell Diameter	53.343-53.424							
* = Longitudinal, T = Transversal, H = Horizontal, V = Vertical, F = Forward, B = Back, I = Intake, E = Exhaust * = Measurements are in mm a = Measurements are in (N-m)								
Manufacturer's Service Limits, (mm) Camshaft Lobe Lift Intake 6.55-6.65 Exhaust Valve Stem to Guide Clearance Intake 0.025-0.094 Exhaust Valve Spring Force Intake 338-374 N-m @ 43.2 mm Exhaust								
Piston Diameter Main Bearings 101.519-101.646 Journal Diameter 62.177-62.212 Shell Diameter 62.240-62.301								

B-34

ENGINE COMPONENTS MEASUREMENTS
MYRTLE BEACH AIR FORCE BASE
ENGINE TYPE: PLYMOUTH, 6 CYLINDER, 225 CID
VEHICLE NO. 79B5212
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	2.49*	2.26	2.39	2.51	2.44	2.67
Bottom	1.24	1.42	2.21	1.47	1.19	2.29
Cylinder Bore Diameter						
Top	L 86.380	L 86.375	L 86.411	L 86.403	L 86.398	L 86.396
Middle	86.383	86.373	86.411	86.403	86.393	86.388
Bottom	86.385	86.378	86.411	86.406	86.396	86.426
Out-of-round	0.018	0.036	0.020	0.013	0.000	86.434
Taper	0.005	0.003	0.023	0.016	0.002	0.012
Connecting Rod Bearings						
Journal Diameter						0.000
Shell Diameter	H 55.532	H 55.537	H 55.537	H 55.535	H 55.537	H 55.537
	F 55.631	F 55.629	F 55.631	F 55.626	F 55.629	F 55.634
Camshaft Lobe Lift	I 6.76	I 6.88	I 6.88	I 6.86	I 6.86	I 6.73
Valve Stem to Guide Clearance	I 0.056	I 0.058	I 0.074	I 0.061	I 0.051	I 0.051
Valve Spring Force [†]	I 231	I 227	I 218	I 227	I 236	I 222
Piston Avg. Diameter	86.355	86.335	86.330	86.332	86.319	86.330
Main Bearings						
Journal Diameter	H 69.845	H 69.847	H 69.845	H 69.847	H 69.847	H 69.847
Shell Diameter	F 69.926	F 69.914	F 69.931	F 69.931	F 69.921	F 69.921
Compression Ring Caps						
Top	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19	0.25-1.19
Bottom	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411	86.360-86.411
Cylinder Bore Diameter	0.13	0.13	0.13	0.13	0.13	0.13
Out-of-round	0.25	0.25	0.25	0.25	0.25	0.25
Taper	55.537-55.563	55.537-55.563	55.537-55.563	55.537-55.563	55.537-55.563	55.537-55.563
Connecting Rod Bearings						
Journal Diameter	55.550-55.626	55.550-55.626	55.550-55.626	55.550-55.626	55.550-55.626	55.550-55.626
Shell Diameter						

Manufacturer's Service Limits, (mm)

Camshaft Lobe Lift
Intake 6.88
Exhaust 6.88
Valve Stem to Guide Clearance 0.03-0.43
Exhaust 0.03-0.43
Valve Spring Force
Intake 218-254 N-m @ 42.86 mm (closed); 609-667 N-m @ 33.3 mm (open)
Exhaust 218-254 N-m @ 42.86 mm (closed); 609-667 N-m @ 33.3 mm (open)

* L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
† Measurements are in mm
‡ Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
MYRTLE BEACH AIR FORCE BASE
ENGINE TYPE: PLYMOUTH, 6 CYLINDER, 225 CID
VEHICLE NO. 78B9187
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	0.099	0.092	0.104	0.119	0.098	0.097
Bottom	0.088	0.049	0.082	0.076	0.087	0.087
Cylinder Bore Diameter						
Top	L* 3.4018	L 3.4014	T 3.4018	L 3.4021	T 3.4008	T 3.4026
Middle	3.4013	3.4019	3.4012	3.4011	3.4021	3.4017
Bottom	3.4014	3.4020	3.4015	3.4014	3.4013	3.4019
Out-of-round	0.0002	0.0005	0.0001	0.0001	0.0009	0.0005
Taper	0.0003	0.0003	0.0003	0.0007	0.0005	0.0000
Connecting Rod Bearings						
Journal Diameter	H 2.1861	V 2.1862	H 2.1863	H 2.1865	V 2.1865	H 2.1866
Shell Diameter	F 2.1905	F 2.1905	F 2.1905	F 2.1903	F 2.1903	F 2.1904
Camshaft Lobe Lift	I 0.271	E 0.275	I 0.261	I 0.269	E 0.265	I 0.268
Valve Stem to Guide Clearance	I 0.0025	E 0.0033	I 0.0018	E 0.0047	E 0.0042	I 0.0019
Valve Spring Force	I 52	E 49	I 52	E 54	E 50	I 51
Piston Avg. Diameter	3.3992	3.3995	3.3996	3.3989	3.3987	3.3989
Main Bearings						
Journal Diameter	No. 1 H 2.7500	No. 2 H 2.7500	No. 3 H 2.7500	No. 4 H 2.7500		
Shell Diameter	F 2.7530	F 2.7528	F 2.7528	F 2.7530	F 2.7529	F 2.7529
Compression Ring Caps						
Top	0.010-0.047	0.010-0.047	0.010-0.047	0.010-0.047	0.010-0.047	0.010-0.047
Bottom	3.4000-3.4020	3.4000-3.4020	3.4000-3.4020	3.4000-3.4020	3.4000-3.4020	3.4000-3.4020
Cylinder Bore Diameter						
Out-of-round	0.005	0.005	0.005	0.005	0.005	0.005
Taper	0.010	0.010	0.010	0.010	0.010	0.010
Connecting Rod Bearings						
Journal Diameter	2.1865-2.1875	2.1865-2.1875	2.1865-2.1875	2.1865-2.1875	2.1865-2.1875	2.1865-2.1875
Shell Diameter	2.1870-2.1900	2.1870-2.1900	2.1870-2.1900	2.1870-2.1900	2.1870-2.1900	2.1870-2.1900

Manufacturer's Service Limits, Inches

Camshaft Lobe Lift						
Intake	0.271					
Exhaust						
Valve Stem to Guide Clearance						
Intake	0.001-0.011					
Exhaust						
Valve Spring Force						
Intake	49-57 lbs	49-57 lbs	49-57 lbs	49-57 lbs	49-57 lbs	49-57 lbs
Exhaust						
Piston Diameter						
Main Bearings	3.3985-3.4015					
Journal Diameter	2.7495-2.7505					
Shell Diameter	2.7500-2.7530					

ENGINE COMPONENTS MEASUREMENTS
MYRTLE BEACH AIR FORCE BASE
ENGINE TYPE: PLYMOUTH, 6 CYLINDER, 225 CID
VEHICLE NO. 78B9187
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	2.51*	2.34	2.64	2.77	2.49	2.46
Bottom	2.24	1.24	2.08	1.93	2.21	2.21
Cylinder Bore Diameter						
Top	L 86.406	L 86.396	L 86.406	L 86.413	L 86.380	L 86.413
Middle	T 86.411	T 86.409	T 86.408	T 86.413	T 86.403	T 86.426
Bottom	B 86.393	B 86.383	B 86.390	B 86.387	B 86.383	B 86.408
Out-of-round	86.416	86.387	86.411	86.396	86.411	86.416
Taper	0.035	0.012	0.032	0.002	0.023	0.013
	0.010	0.009	0.008	0.017	0.013	0.000
Connecting Rod Bearings						
Journal Diameter	H 55.527	H 55.537	H 55.532	H 55.537	H 55.537	H 55.396
Shell Diameter	F 55.639	F 55.636	F 55.634	F 55.634	F 55.634	F 55.636
Camshaft Lobe Lift	I 6.88	I 6.94	I 6.83	I 6.81	I 6.91	I 6.81
Valve Stem to Guide Clearance	I 0.054	I 0.053	I 0.054	I 0.058	I 0.076	I 0.114
Valve Spring Force ^d	I 231	I 218	I 231	I 240	I 222	I 231
Piston Avg. Diameter	86.340	86.347	86.350	86.332	86.327	86.332
Main Bearings						
Journal Diameter	No. 1 H 69.850	No. 2 H 69.850	No. 3 H 69.850	No. 4 H 69.850		
Shell Diameter	F 69.926	F 69.926	F 69.921	F 69.926	F 69.924	F 69.924

Manufacturer's Service Limits, (mm)

Compression Ring Caps	0.25-1.19	Camshaft Lobe Lift		Piston Diameter	86.322-86.398
Top		Intake	6.84	Main Bearings	
Bottom		Exhaust		Journal Diameter	69.837-69.863
Cylinder Bore Diameter	86.360-86.410	Valve Stem to Guide Clearance		Shell Diameter	69.850-69.926
Out-of-round	0.13	Intake	0.03-0.13		
Taper	0.25	Exhaust			
Connecting Rod Bearings		Valve Spring Force			
Journal Diameter	55.537-55.563	Intake	214-254 N-m (closed); 60-607 N-m (open)		
Shell Diameter	55.550-55.626	Exhaust			

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 d = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
MYRTLE BEACH AIR FORCE BASE
ENGINE TYPE: PLYMOUTH, 6 CYLINDER, 225 CID
VEHICLE NO. 78B9188
TYPE OIL: BLUE (D)

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.019	0.049	0.019	0.047	0.020	0.018
Bottom	0.032	0.031	0.027	0.032	0.024	0.021
Cylinder Bore Diameter						
Top	L* 3.4012	L 3.4017	L 3.4009	L 3.4012	L 3.4016	L 3.4015
Middle	3.4005	3.4020	3.4007	3.4006	3.4009	3.4015
Bottom	3.4008	3.4011	3.4009	3.4007	3.4011	3.4015
Out-of-round	0.0008	0.0001	0.0004	0.0003	0.0001	0.0005
Taper	0.0004	0.0006	0.0000	0.0005	0.0005	0.0002
Connecting Rod Bearings						
Journal Diameter	H 2.1869	H 2.1869	H 2.1868	H 2.1868	H 2.1869	H 2.1869
Shell Diameter	F 2.2125	F 2.2131	F 2.2135	F 2.2135	F 2.2130	F 2.2130
Camshaft Lobe Lift	I 0.272	I 0.268	I 0.269	I 0.272	I 0.271	I 0.274
Valve Stem to Guide Clearance	I 0.0022	I 0.0020	I 0.0022	I 0.0020	I 0.0021	I 0.0022
Valve Spring Force	I 142	I 135	I 145	I 137	I 140	I 135
Piston Avg. Diameter	3.3994	3.4008	3.4001	3.3994	3.3999	3.4000
Main Bearings						
Journal Diameter	No. 1 H 2.7498	No. 2 H 2.7500	No. 3 H 2.7500	No. 4 H 2.7496		
Shell Diameter	F 2.7515	F 2.7513	F 2.7516	F 2.7515	F 2.7514	F 2.7512
Compression Ring Gaps						
Top	0.010-0.047	Camshaft Lobe Lift Intake 0.271				
Bottom	3.4000-3.4020	Exhaust Valve Stem to Guide Clearance 0.0010-0.0170				
Cylinder Bore Diameter	0.005	Intake Valve Spring Force 2.1865-2.1875				
Taper	0.010	Exhaust Intake 2.1870-2.1900				
Connecting Rod Bearings						
Journal Diameter						
Shell Diameter						

Manufacturer's Service Limits, Inches

Component	Cylinder No.											
	1		2		3		4		5		6	
Compression Ring Gaps												
Top	0.48 ⁺	1.24										
Bottom	0.81	0.79										
Cylinder Bore Diameter												
Top	L	L	T	L	L	T	L	L	L	T	L	T
Middle	86.390	86.403	86.411	86.406	86.383	86.393	86.390	86.398	86.401	86.403	86.385	86.398
Bottom	86.373	86.401	86.411	86.411	86.378	86.401	86.375	86.398	86.383	86.406	86.375	86.398
Out-of-round	0.021	0.003	0.006	0.018	0.010	0.010	0.008	0.008	0.002	0.013	0.013	0.013
Taper	0.010	0.015		0.000			0.012		0.013		0.005	
Connecting Rod Bearings												
Journal Diameter	H	H	V	V	H	V	H	V	H	V	H	V
	55.547	55.547	55.547	55.550	55.545	55.545	55.545	55.550	55.547	55.550	55.550	55.547
Shell Diameter	F	F	B	B	F	B	F	B	F	B	F	B
	56.198	56.205	56.213	56.220	56.223	56.215	56.223	56.223	56.210	56.223	56.210	56.210
Camshaft Lobe Lift	I	E	E	E	I	E	I	E	I	E	I	E
	6.91	7.01	7.81	6.99	6.83	6.96	6.91	7.04	6.88	6.96	6.88	6.96
Valve Stem to Guide Clearance	I	E	E	E	I	E	I	E	I	E	I	E
	0.056	0.053	0.051	0.051	0.056	0.053	0.051	0.058	0.053	0.056	0.056	0.056
Valve Spring Force ^g	I	E	E	E	I	E	I	E	I	E	I	E
	632	623	601	645	645	641	609	627	623	627	601	614
Piston Avg. Diameter	86.345	86.380			83.363		86.345		86.357		86.360	
Middle and bottom of skirt												
Main Bearings		No. 1	No. 2	No. 3	No. 4							
Journal Diameter	H	V	H	V	H	V	H	V	H	V	H	V
	69.845	69.845	69.850	69.850	69.850	69.847	69.840	69.845	69.840	69.845	69.840	69.845
Shell Diameter	F	B	F	B	F	B	F	B	F	B	F	B
	69.888	69.888	69.883	69.891	69.888	69.896	69.886	69.880	69.886	69.880	69.886	69.880

Manufacturer's Service Limits, (mm)

Compression Ring Caps					
Top	0.25-1.19				
Bottom					
Cylinder Bore Diameter	86.3600-86.4110				
Out-of-round	0.13				
Taper	0.25				
Connecting Rod Bearings					
Journal Diameter	55.537-55.563				
Shell Diameter	55.550-55.626				
Camshaft					
Intake					
Exhaust					
Valve Stem to Guide Clearance					
Intake					
Exhaust					
Valve Spring Force					
Intake					
Exhaust					
Camshaft Lock Lift					
Intake					
Exhaust					
Piston Diameter					
Main Bearings					
Journal Diameter					
Shell Diameter					

* L = Longitudinal, T = Transverse, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
* * * Measurements are in mm
* * * Measurements are in (N-m)

TYPE OIL: GREEN

Journal Diameter

ENGINE COMPONENTS MEASUREMENTS
OFFUTT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4766
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.74 ⁺	0.69	0.81	0.66	0.99	0.74
Bottom	0.84	0.74	0.74	0.69	0.74	0.71
Cylinder Bore Diameter						
Top	L 98.494	L 98.476	L 98.483	L 98.450	L 98.481	L 98.476
Middle	98.509	98.463	98.481	98.458	98.455	98.466
Bottom	98.494	98.478	98.481	98.476	98.478	98.468
Out-of-round	0.008	0.013	0.002	0.026	0.003	0.018
Taper	0.000	0.002	0.002	0.026	0.003	0.008
Connecting Rod Bearings						
Journal Diameter	H 53.327	H 53.330	H 53.330	H 53.330	H 53.327	H 53.330
Shell Diameter	F 53.416	F 53.401	F 53.391	F 53.393	F 53.411	F 53.404
Camshaft Lobe Lift	I 5.82	I 5.79	I 5.74	I 5.59	I 5.41	I 5.11
Valve Stem to Guide Clearance	I 0.030	I 0.036	I 0.041	I 0.038	I 0.036	I 0.033
Valve Spring Force [⊕]	I 778	I 774	I 756	I 765	I 752	I 774
Piston Avg. Diameter	98.374	98.369	98.369	98.372	98.356	98.382
Main Bearings						
Journal Diameter	No. 1 H 58.390	No. 2 H 58.382	No. 3 H 58.377	No. 4 H 58.379	No. 5 H 58.377	No. 6 H 58.382
Shell Diameter	F 58.542	F 58.443	F 58.443	F 58.466	F 58.453	F 58.443
Compression Ring Gaps	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76
Top	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489
Bottom	0.05	0.05	0.05	0.05	0.05	0.05
Cylinder Bore Diameter	0.03	0.03	0.03	0.03	0.03	0.03
Out-of-round	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340
Taper	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416
Connecting Rod Bearings						
Journal Diameter	347-383 N-m @ 42.16 mm (closed); 756-801 N-m @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 N-m @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 N-m @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 N-m @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 N-m @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 N-m @ 32.0 mm (open)
Shell Diameter						

* L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
+ = Measurements are in mm
⊕ = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
OFFUTT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4768
TYPE OIL: BLUE (C)

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
	Top	0.028	0.032	0.027	0.030	0.029
	Bottom	0.033	0.027	0.030	0.032	0.029
Cylinder Bore Diameter						
	Top	3.8752	3.8746	3.8762	3.8758	3.8763
	Middle	3.8777	3.8761	3.8771	3.8766	3.8771
	Bottom	3.8779	3.8767	3.8773	3.8773	3.8772
	Out-of-round	0.0000	0.0016	0.0001	0.0005	0.0008
	Taper	0.0027	0.0021	0.0001	0.0015	0.0003
Connecting Rod Bearings						
	Journal Diameter	H	H	V	H	V
	Shell Diameter	2.0993	2.0994	2.0994	2.0992	2.0992
Camshaft Lobe Lift						
	Intake	0.220	0.182	0.224	0.227	0.219
	Exhaust	0.220	0.182	0.224	0.227	0.219
Valve Stem to Guide Clearance						
	Intake	0.0015	0.0017	0.0015	0.0017	0.0016
	Exhaust	0.0015	0.0017	0.0015	0.0017	0.0016
Valve Spring Force						
	Intake	170	169	172	171	170
	Exhaust	170	169	172	171	170
Piston Avg. Diameter						
	Middle and bottom of skirt	3.8728	3.8735	3.8721	3.8729	3.8724
Main Bearings						
	Journal Diameter	H	V	H	V	H
	Shell Diameter	2.2990	2.2991	2.2983	2.2988	2.2988
	Out-of-round	0.002	0.002	0.002	0.002	0.002
Compression Ring Gaps						
	Top	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030
	Bottom	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030
	Out-of-round	0.001	0.001	0.001	0.001	0.001
Connecting Rod Bearings						
	Journal Diameter	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000
	Shell Diameter	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030
	Out-of-round	0.001	0.001	0.001	0.001	0.001

Manufacturer's Service Limits, Inches

Compression Ring Gaps	Camshaft Lobe Lift	0.2197-0.2237	Piston Diameter	3.8700-3.8749
	Intake		Main Bearings	
	Exhaust		Journal Diameter	2.2979-2.2994
	Valve Stem to Guide Clearance	0.0010-0.0037	Shell Diameter	2.2989-2.3029
Connecting Rod Bearings	Intake			
	Exhaust			
	Valve Spring Force	78-86 lbs @ 1.66" (closed); 170-180 lbs @ 1.26" (open)		
	Intake			
	Exhaust			

ENGINE COMPONENTS MEASUREMENTS
OFFUTT AIR FORCE BASE
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4768
TYPE OIL: BLUE (C)

Component	Cylinder No.											
	1	2	3	4	5	6						
Compression Ring Gaps												
Top	0.71*	0.69	0.81	0.69	0.76	0.74						
Bottom	0.84	0.81	0.69	0.76	0.81	0.74						
Cylinder Bore Diameter												
	L	L	L	L	L	L						
	98.430	98.415	98.455	98.489	98.463	98.483						
	98.494	98.453	98.478	98.486	98.478	98.455						
	98.499	98.468	98.483	98.491	98.471	98.463						
Out-of-round	0.000	0.040	0.002	0.013	0.020	0.045						
Taper	0.069	0.053	0.002	0.038	0.008	0.025						
Connecting Rod Bearings												
Journal Diameter	H	H	H	H	H	H						
	53.322	53.325	53.325	53.320	53.317	53.320						
Shell Diameter	F	F	F	F	F	F						
	53.853	53.853	53.853	53.378	53.386	53.404						
Camshaft Lobe Lift	I	I	I	I	I	I						
	5.59	4.63	5.69	5.69	5.84	5.51						
Valve Stem to Guide Clearance	I	I	I	I	I	I						
	0.038	0.043	0.038	0.038	0.038	0.041						
Valve Spring Force ^g	I	I	I	I	I	I						
	756	752	765	761	756	756						
Piston Avg. Diameter												
Middle and bottom of skirt	98.369	98.387	98.351	98.372	98.359	98.372						
Main Bearings												
Journal Diameter	H	H	H	H	H	H						
	58.395	58.397	58.377	58.382	58.390	58.390						
Shell Diameter	F	F	F	F	F	F						
	58.445	58.458	58.433	58.458	58.456	58.471						

Manufacturer's Service Limits, (mm)

Compression Ring Gaps												
Top	0.25-0.76											
Bottom												
Cylinder Bore Diameter	98.412-98.489											
Out-of-round	0.05											
Taper	0.03											
Connecting Rod Bearings												
Journal Diameter	53.315-53.340											
Shell Diameter	53.340-53.416											
Camshaft Lobe Lift												
Intake												
Exhaust												
Valve Stem to Guide Clearance												
Intake												
Exhaust												
Valve Spring Force												
Intake												
Exhaust												
Piston Diameter												
Main Bearing												
Journal Diameter												
Shell Diameter												

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 g = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
PETERSON FIELD
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4571
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	0.027	0.025	0.025	0.020	0.022	0.025
Bottom	0.029	0.031	0.030	0.030	0.030	0.031
Cylinder Bore Diameter						
Top	3.8773	3.8751	3.8768	3.8767	3.8769	3.8765
Middle	3.8766	3.8754	3.8758	3.8769	3.8755	3.8752
Bottom	3.8768	3.8762	3.8764	3.8770	3.8767	3.8767
Out-of-round	0.0005	0.0014	0.0001	0.0007	0.0005	0.0013
Taper	0.0005	0.0003	0.0004	0.0000	0.0002	0.0006
Connecting Rod Bearings						
Journal Diameter	H 2.0990	H 2.0990	H 2.0989	H 2.0991	H 2.0988	H 2.0989
Shell Diameter	F 2.1202	F 2.1205	F 2.1018	F 2.1015	F 2.1028	F 2.1202
Camshaft Lobe Lift	I 0.218	I 0.226	I 0.223	I 0.231	I 0.233	I 0.232
Valve Stem to Guide Clearance	I 0.0016	I 0.0015	I 0.0015	I 0.0015	I 0.0014	I 0.0015
Valve Spring Force	I 177	I 177	I 170	I 161	I 171	I 171
Piston Avg. Diameter	3.8718	3.8715	3.8719	3.8723	3.8720	3.8726
Main Bearings						
Journal Diameter	H 2.2990	H 2.2979	H 2.2984	H 2.2986	H 2.2985	H 2.2985
Shell Diameter	F 2.3000	F 2.3005	F 2.3007	F 2.3010	F 2.3003	F 2.3010
Compression Ring Caps						
Top	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030	0.010-0.030
Bottom	3.8745-3.8775	3.8745-3.8775	3.8745-3.8775	3.8745-3.8775	3.8745-3.8775	3.8745-3.8775
Cylinder Bore Diameter	0.002	0.002	0.002	0.002	0.002	0.002
Out-of-round	0.001	0.001	0.001	0.001	0.001	0.001
Taper	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000	2.0990-2.1000
Connecting Rod Bearings						
Journal Diameter	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030	2.1000-2.1030
Shell Diameter						

Manufacturer's Service Limits, Inches

Camshaft Lobe Lift	0.2197-0.2237	Piston Diameter	3.8700-3.8749
Intake		Main Bearings	2.2979-2.2994
Exhaust		Journal Diameter	2.2989-2.3029
Valve Stem to Guide Clearance	0.0010-0.0037	Shell Diameter	
Intake			
Exhaust			
Valve Spring Force	78-86 lbs @ 1.66" (closed); 170-180 lbs @ 1.26" (open)		
Intake			
Exhaust			

ENGINE COMPONENTS MEASUREMENTS
PETERSON FIELD
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4571
TYPE OIL: YELLOW

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.69*	0.64	0.64	0.51	0.56	0.64
Bottom	0.74	0.79	0.76	0.76	0.76	0.79
Cylinder Bore Diameter						
Top	98.583	98.471	98.463	98.471	98.473	98.489
Middle	98.466	98.435	98.453	98.445	98.438	98.473
Bottom	98.471	98.435	98.455	98.476	98.468	98.468
Out-of-round	0.012	0.035	0.003	0.018	0.013	0.034
Taper	0.012	0.007	0.010	0.000	0.005	0.015
Connecting Rod Bearings						
Journal Diameter	H	V	H	V	H	V
	53.315	53.315	53.317	53.320	53.312	53.315
Shell Diameter	F	B	F	B	F	B
	53.853	53.861	53.411	53.378	53.411	53.853
Camshaft Lobe Lift	I	E	I	E	I	E
	5.54	5.74	5.74	5.66	5.82	5.64
Valve Stem to Guide Clearance	I	E	I	E	I	E
	0.041	0.038	0.030	0.038	0.041	0.038
Valve Spring Force ϕ	I	F	I	E	I	E
	787	770	752	756	770	752
Piston Avg. Diameter						
Middle and bottom of skirt	98.344	98.336	98.346	98.356	98.349	98.466
Main Bearings						
Journal Diameter	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
	H	V	H	V	H	V
	58.395	58.367	58.379	58.384	58.372	58.374
Shell Diameter	F	B	F	B	F	B
	58.420	58.433	58.443	58.445	58.438	58.440
Compression Ring Gaps						
Top	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76
Bottom	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76
Cylinder Bore Diameter						
Out-of-round	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489
Taper	0.05	0.05	0.05	0.05	0.05	0.05
Connecting Rod Bearings						
Journal Diameter	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340
Shell Diameter	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416

Manufacturer's Service Limits, (mm)

Compression Ring Gaps	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76
Top	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76
Bottom	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76	0.25-0.76
Cylinder Bore Diameter	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489	98.412-98.489
Out-of-round	0.05	0.05	0.05	0.05	0.05	0.05
Taper	0.03	0.03	0.03	0.03	0.03	0.03
Connecting Rod Bearings						
Journal Diameter	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340	53.315-53.340
Shell Diameter	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416	53.340-53.416
Camshaft Lobe Lift	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68
Intake	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68
Exhaust	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68	5.58-5.68
Valve Stem to Guide Clearance	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094
Intake	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094
Exhaust	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094	0.025-0.094
Valve Spring Force	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)
Intake	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)
Exhaust	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)	347-383 N-m @ 42.16 mm (closed); 756-801 @ 32.0 mm (open)

*L = Longitudinal, T = Transverse, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 ϕ = Measurements are in N-m

ENGINE COMPONENTS MEASUREMENTS
PETERSON FIELD
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4569
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Gaps						
Top	0.025	0.024	0.023	0.022	0.021	0.024
Bottom	0.026	0.026	0.025	0.027	0.027	0.026
Cylinder Bore Diameter						
Top	I ⁴ 3.8765	L 3.8770	T 3.8759	L 3.8758	T 3.8761	L 3.8759
Middle	3.8757	3.8773	3.8780	3.8746	3.8760	3.8746
Bottom	3.8761	3.8778	3.8782	3.8755	3.8756	3.8753
Out-of-round	0.0000	0.0008	0.0001	0.0002	0.0002	0.0004
Taper	0.0004	0.0008	0.0001	0.0003	0.0001	0.0008
Connecting Rod Bearings						
Journal Diameter	H 2.0985	H 2.0986	H 2.0985	H 2.0985	H 2.0985	H 2.0985
Shell Diameter	F 2.1028	F 2.1026	F 2.1024	F 2.1025	F 2.1025	F 2.1028
Camshaft Lobe Lift	Not measured					
Valve Stem to Guide Clearance	I 0.0028	I 0.0030	E 0.0030	I 0.0029	I 0.0030	I 0.0031
Valve Spring Force	I 82	I 81	E 80	I 81	E 82	I 81
Piston Avg. Diameter	3.8720	3.8725	3.8720	3.8722	3.8725	3.8725
Main Bearings						
Journal Diameter	H 2.2985	V 2.2984	H 2.2984	H 2.2984	V 2.2985	H 2.2985
Shell Diameter	F 2.3003	F 2.3002	F 2.3010	F 2.3020	F 2.3018	F 2.3010
Compression Ring Gaps						
Top	0.010-0.030	Camshaft Lobe Lift	0.2197-0.2237	Piston Diameter	3.8700-3.8749	
Bottom	3.8745-3.8775	Intake	0.0010-0.0037	Main Bearings	2.2979-2.2994	
Cylinder Bore Diameter	0.002	Exhaust		Journal Diameter	2.2989-2.3029	
Out-of-round	0.001	Valve Stem to Guide Clearance		Shell Diameter		
Taper	2.0993-2.1000	Intake				
Connecting Rod Bearings	2.1000-2.1030	Exhaust				
Journal Diameter		Valve Spring Force				
Shell Diameter		Intake				
		Exhaust				

Manufacturer's Service Limits, Inches

ENGINE COMPONENTS MEASUREMENTS
PETERSON FIELD
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B4569
TYPE OIL: GREEN

Component	Cylinder No.					
	1	2	3	4	5	6
Compression Ring Caps						
Top	0.64*	0.61	0.58	0.56	0.53	0.61
Bottom	0.66	0.66	0.64	0.69	0.69	0.66
Cylinder Bore Diameter						
Top	98.463	98.463	98.448	98.445	98.453	98.438
Middle	98.448	98.483	98.430	98.415	98.450	98.433
Bottom	98.453	98.445	98.445	98.438	98.455	98.468
Out-of-round	0.000	0.020	0.002	0.005	0.010	0.010
Taper	0.010	0.020	0.003	0.007	0.002	0.020
Connecting Rod Bearings						
Journal Diameter						
Shell Diameter						
Camshaft Lobe Lift						
Valve Stem to Guide Clearance						
Valve Spring Force [⊙]						
Piston Avg. Diameter						
Middle and bottom of skirt						
Main Bearings						
Journal Diameter						
Shell Diameter						
Compression Ring Caps						
Top	0.25-0.76					
Bottom						
Cylinder Bore Diameter						
Out-of-round						
Taper						
Connecting Rod Bearings						
Journal Diameter						
Shell Diameter						

Manufacturer's Service Limits, (mm)

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 ⊙ = Measurements are in mm
 ⊙ = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS

PETERSON FIELD

ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID

VEHICLE NO. 78B8831

TYPE OIL: BLUE (D)

[illegible]

Manufacturer's Service Limits, Inches

Piston Diameter	3.8700-3.8749
Main Bearings	
Journal Diameter	2.2979-2.2994
Shell Diameter	2.2989-2.3029

Camshaft Lobe Lift	0.2197-0.2237
Intake	
Exhaust	
Valve Stem to Guide Clearance	0.0010-0.0037
Intake	

78-86 lbs @ 1.66" (closed); 170-180 lbs @ 1.26" (open)

ENGINE COMPONENTS MEASUREMENTS
PETERSON FIELD
ENGINE TYPE: CHEVROLET, 6 CYLINDER, 292 CID
VEHICLE NO. 78B831
TYPE OIL: BLUE (D)

Component	Cylinder No.											
	1	2	3	4	5	6						
Compression Ring Gaps												
Top	0.61*	0.66	0.64	0.74	0.61	0.61						
Bottom	0.69	0.64	0.69	0.66	0.66	0.66						
Cylinder Bore Diameter												
Top	98.478	98.461	98.461	98.463	98.448	98.478						
Middle	98.450	98.463	98.450	98.463	98.448	98.463						
Bottom	98.453	98.455	98.463	98.463	98.461	98.463						
Out-of-round	0.018	0.003	0.002	0.002	0.023	0.030						
Taper	0.025	0.005	0.002	0.002	0.013	0.010						
Connecting Rod Bearings												
Journal Diameter	H	V	H	V	H	V						
Shell Diameter	53.312	53.315	53.310	53.310	53.315	53.315						
	F	F	F	F	F	F						
	53.416	53.409	53.411	53.411	53.406	53.404						
Camshaft Lobe Lift	I	F	I	F	I	F						
	5.69	5.77	5.61	5.59	5.72	5.54						
Valve Stem to Guide Clearance	I	E	I	E	I	E						
	0.076	0.074	0.056	0.061	0.079	0.051						
Valve Spring Force^a	I	F	I	F	I	F						
	356	360	356	356	360	365						
Piston Avg. Diameter												
Middle and bottom of skirt	98.377	98.374	98.354	98.359	98.362	98.364						
Main Bearings												
Journal Diameter	H	V	H	V	H	V						
Shell Diameter	58.382	58.379	58.379	58.382	58.379	58.382						
	F	F	F	F	F	F						
	58.517	58.517	58.450	58.440	58.433	58.433						
Compression Ring Gaps												
Top	0.25-0.76	Camshaft Lobe Lift	Intake	Exhaust	5.58-5.68	Piston Diameter						
Bottom	98.412-98.489	Valve Stem to Guide Clearance	Intake	Exhaust	0.125-0.194	Main Bearings						
Out-of-round	0.05	Valve Spring Force	Intake	Exhaust	54.7-54.8 N-m @ 32.0 mm (open)	Journal Diameter						
Taper	0.03	Intake	Exhaust	Exhaust		Shell Diameter						
Connecting Rod Bearings												
Journal Diameter	53.315-53.340	Intake	Exhaust	Exhaust								
Shell Diameter	53.340-53.416	Exhaust	Exhaust	Exhaust								

H = Longitudinal, T = Transversal, H = Horizontal, V = Vertical.
 F = Forward, B = Back, I = Intake, E = Exhaust
 * = Measurements are in mm
 a = Measurements are in (N-m)

ENGINE COMPONENTS MEASUREMENTS
 RANDOLPH AIR FORCE BASE
 ENGINE TYPE: FORD, 4 CYLINDER, 2.3 LITRE
 VEHICLE NO. 79B5719
 TYPE OIL: YELLOW

Component	Cylinder No.			
	1	2	3	4
Compression Ring Gaps				
Top	0.030	0.028	0.030	0.029
Bottom	0.028	0.028	0.030	0.028
Cylinder Bore Diameter				
Top	I* 3.7802	I 3.7809	L 3.7809	T 3.7812
Middle	3.7802	3.7805	3.7805	3.7812
Bottom	3.7804	3.7819	3.7813	3.7813
Out-of-round	0.0023	0.0006	0.0010	0.0005
Taper	0.0002	0.0000	0.0001	0.0006
Connecting Rod Bearings				
Journal Diameter	H 2.0465	V 2.0465	H 2.0465	V 2.0466
Shell Diameter	Not measured			
Camshaft Lobe Lift	I 0.242	E 0.241	I 0.242	E 0.240
Valve Stem to Guide Clearance	Not measured			
Valve Spring Force	Not measured			
Piston Avg. Diameter	3.7794	3.7795	3.7797	3.7795
Middle and bottom of skirt				
Main Bearings				
Journal Diameter	No. 1 H 2.3989	No. 2 H 2.3989	No. 3 H 2.3987	No. 4 H 2.3986
Shell Diameter	Not measured			
Manufacturer's Service Limits, Inches				
Compression Ring Gaps	0.010-0.020	Camshaft Lobe Lift		Piston Diameter
Top		Intake	0.2387-0.2437	Main Bearings
Bottom		Exhaust		Journal Diameter
Cylinder Bore Diameter	3.7795-3.7831	Valve Stem to Guide Clearance		Shell Diameter
Out-of-round	0.005	Intake		
Taper	0.010	Exhaust		
Connecting Rod Bearings		Valve Spring Force		
Journal Diameter	2.0464-2.0472	Intake		
Shell Diameter	2.0472-2.0498	Exhaust		

ENGINE COMPONENTS MEASUREMENTS
 RANDOLPH AIR FORCE BASE
 ENGINE TYPE: FORD, 4 CYLINDER, 2.3 LITRE
 VEHICLE NO. 79B5719
 TYPE OIL: YELLOW

Component	Cylinder No.			
	1	2	3	4
Compression Ring Gaps				
Top	0.76 ⁺	0.71	0.76	0.74
Bottom	0.71	0.71	0.76	0.71
Cylinder Bore Diameter				
Top	96.017	96.036	96.035	96.030
Middle	96.017	96.048	96.025	96.012
Bottom	96.022	96.060	96.032	96.015
Out-of-round	0.058	0.015	0.025	0.013
Taper	0.005	0.000	0.003	0.015
Connecting Rod Bearings				
Journal Diameter	H 51.981	V 51.981	H 51.981	V 51.984
Shell Diameter	Not measured			
Camshaft Lobe Lift	I 6.15	E 6.12	I 6.15	E 6.10
Valve Stem to Guide Clearance	Not measured			
Valve Spring Force	Not measured			
Piston Avg. Diameter	95.997	95.999	96.004	95.999
Middle and bottom of skirt				
Main Bearings	No. 1	No. 2	No. 3	No. 4
Journal Diameter	H 60.932	V 60.932	H 60.927	V 60.924
Shell Diameter	Not measured			

Manufacturer's Service Limits, (mm)

Compression Ring Gaps	0.25-0.51	Camshaft Lobe Lift		Piston Diameter	95.992-96.007
Top		Intake		Main Bearings	
Bottom		Exhaust	6.06-6.14	Journal Diameter	60.914-60.935
Cylinder Bore Diameter	95.999-96.091	Valve Stem to Guide Clearance		Shell Diameter	60.935-61.001
Out-of-round	0.13	Intake			
Taper	0.25	Exhaust			
Connecting Rod Bearings		Valve Spring Force			
Journal Diameter	51.979-51.999	Intake			
Shell Diameter	51.999-52.065	Exhaust			

* L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 + = Measurements are in mm

ENGINE COMPONENTS MEASUREMENTS
 RANDOLPH AIR FORCE BASE
 ENGINE TYPE: FORD, 4 CYLINDER, 2.3 LITRE
 VEHICLE NO. 79B5720
 TYPE OIL: BLUE (A)

Component	Cylinder No.			
	1	2	3	4
Compression Ring Caps				
Top	0.025	0.024	0.028	0.022
Bottom	0.025	0.028	0.025	0.023
Cylinder Bore Diameter				
Top	L* 3.7796	L 3.7810	T 3.7813	T 3.7807
Middle	3.7796	3.7812	3.7811	3.7818
Bottom	3.7797	3.7806	3.7808	3.7819
Out-of-round	0.0017	0.0003	0.0009	0.0005
Taper	0.0001	0.0004	0.0002	0.0005
Connecting Rod Bearings				
Journal Diameter	H	V	H	V
Shell Diameter	Not measured	2.0465	2.0464	2.0465
Camshaft Lobe Lift	I 0.242	E 0.242	I 0.243	E 0.244
Valve Stem to Guide Clearance	Not measured	0.242	0.245	0.242
Valve Spring Force ^g	Not measured	Not measured	Not measured	Not measured
Piston Avg. Diameter	3.7797	3.7800	3.7801	3.7797
Middle and bottom of skirt				
Main Bearings	No. 1	No. 2	No. 3	No. 4
Journal Diameter	H	H	H	H
Shell Diameter	Not measured	2.3987	2.3988	2.3985
Compression Ring Caps				
Top	0.010-0.020	Camshaft Lobe Lift		
Bottom		Intake		
Cylinder Bore Diameter	3.7795-3.7831	Exhaust		
Out-of-round	0.005	Valve Stem to Guide Clearance		
Taper	0.010	Intake		
Connecting Rod Bearings		Exhaust		
Journal Diameter	2.0464-2.0472	Valve Spring Force		
Shell Diameter	2.0472-2.0498	Intake		
		Exhaust		

Manufacturer's Service Limits, Inches

3.7792-3.7798
 2.3982-2.3990
 2.3990-2.4016

Piston Diameter
 Main Bearings
 Journal Diameter
 Shell Diameter

TYPE OIL: BLUE (A)

Component	Cylinder No.							
	1		2		3		4	
Compressor Ring Gaps								
Top	0.64*		0.61		0.71		0.56	
Bottom	0.64		0.71		0.64		0.58	
Cylinder Bore Diameter								
Top	L	T	L	T	L	T	L	T
Middle	96.002	96.045	96.037	96.045	96.037	96.060	96.017	96.030
Bottom	96.002	96.042	96.027	96.040	96.022	96.058	96.007	96.035
Out-of-round	96.004	96.035	96.027	96.040	96.032	96.060	96.004	96.032
Taper	0.043		0.008		0.023		0.013	
	0.003		0.010		0.005		0.013	
Connecting Rod Bearings								
Journal Diameter	H	V	H	V	H	V	H	V
Shell Diameter	Not measured		51.981	51.981			51.981	51.979
Camschaft Lobe Lift	I	E	I	E	I	E	I	E
	6.15	6.15	6.15	6.22	6.17	6.20	6.15	6.17
Valve Stem to Guide Clearance	Not measured							
Valve Spring Force	Not measured							
Piston Avg. Diameter							96.004	
Middle and bottom of skirt			96.012		96.015			
Main Bearings								
Journal Diameter	No. 1	No. 2	H	V	H	V	No. 4	V
			60.927	60.935			60.922	60.924
Shell Diameter	Not measured							

Compressor Ring Gaps		Manufacturer's Service Limits, (mm)	
Top	0.25-0.51	Camshaft Lobe Lift	Piston Diameter
Bottom		Intake	Main Bearings
Cylinder Bore Diameter	95.999-96.091	Exhaust	Journal Diameter
Out-of-round	0.13	Valve Stem to Guide Clearance	Shell Diameter
Taper	0.25	Intake	
Connecting Rod Bearings		Exhaust	
Journal Diameter	51.979-51.999	Valve Spring Force	
Shell Diameter	51.999-52.065	Intake	
		Exhaust	

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
F = Forward, B = Back, I = Intake, E = Exhaust
† - Measurements are in mm

Component	Cylinder No.			
	1	2	3	4
Compression Ring Gaps				
Top	0.027	0.025	0.026	0.028
Bottom	0.032	0.026	0.027	0.030
Cylinder Bore Diameter				
Top	L*	L	L	L
Middle	3.7802	3.7805	3.7807	3.7810
Bottom	3.7796	3.7801	3.7800	3.7802
Out-of-round	3.7799	3.7805	3.7805	3.7804
Taper	0.0021	0.0010	0.0017	0.0011
	0.0003	0.0000	0.0006	0.0006
Connecting Rod Bearings				
Journal Diameter	H	H	H	H
	2.0468	2.0468		2.0467
Shell Diameter	Not measured		V	V
				2.0467
Camshaft Lobe Lift				
	I	E	E	E
	0.241	0.242	0.240	0.242
		0.246	0.241	0.241
Valve Stem to Guide Clearance	Not measured			
Valve Spring Force	Not measured			
Piston Avg. Diameter				
Middle and bottom of skirt	3.7801	3.7795	3.7802	3.7797
Main Bearings				
Journal Diameter	No. 1	No. 2	No. 3	No. 4
	H	H	H	H
	2.3988	2.3988	2.3987	2.3986
Shell Diameter	Not measured			

Compression Ring Caps		Service Limits, Inches	
Top	0.010-0.020	Camshaft Lobe Lift	
Bottom		Intake	0.2387-0.2437
Cylinder Bore Diameter	3.7795-3.7831	Exhaust	
Out-of-round	0.005	Valve Stem to Guide Clearance	
Taper	0.010	Intake	
Connecting Rod Bearings		Exhaust	
Journal Diameter	2.0464-2.0472	Valve Spring Force	
Shell Diameter	2.0472-2.0498	Intake	
		Exhaust	
		Piston Diameter	3.7792-3.7798
		Main Bearings	
		Journal Diameter	2.3982-2.3990
		Shell Diameter	2.3990-2.4016

ENGINE COMPONENTS MEASUREMENTS
 RANDOLPH AIR FORCE BASE
 ENGINE TYPE: FORD, 4 CYLINDER, 2.3 LITRE
 VEHICLE NO. 79B5721
 TYPE OIL: GREEN

Component	Cylinder No.			
	1	2	3	4
Compression Ring Gaps				
Top	0.69 ⁺	0.64	0.66	0.71
Bottom	0.81	0.66	0.69	0.76
Cylinder Bore Diameter				
Top	L 96.017	L 96.070	T 96.030	T 96.073
Middle	96.002	96.063	96.015	96.037
Bottom	96.009	96.058	96.012	96.065
Out-of-round	0.053	0.025	96.025	96.022
Taper	0.008	0.000	0.043	0.028
			0.005	0.015
Connecting Rod Bearings				
Journal Diameter	H 51.989	V 51.989	H 51.986	V 51.986
Shell Diameter	Not measured			
Camshaft Lobe Lift	I 6.12	E 6.15	I 6.12	E 6.20
Valve Stem to Guide Clearance	Not measured			
Valve Spring Force	Not measured			
Piston Avg. Diameter	96.015	95.999	96.017	96.004
Middle and bottom of skirt				
Main Bearings	No. 1	No. 2	No. 3	No. 4
Journal Diameter	H 60.930	H 60.930	H 60.927	H 60.924
Shell Diameter	Not measured			

Manufacturer's Service Limits, (mm)			
Compression Ring Gaps	0.25-0.51	Camshaft Lobe Lift	
Top		Intake	6.06-6.19
Bottom		Exhaust	
Cylinder Bore Diameter	95.999-96.091	Valve Stem to Guide Clearance	
Out-of-round	0.13	Intake	
Taper	0.25	Exhaust	
Connecting Rod Bearings		Valve Spring Force	
Journal Diameter	51.979-51.999	Intake	
Shell Diameter	51.999-52.065	Exhaust	
		Piston Diameter	95.992-96.007
		Main Bearings	60.914-60.935
		Journal Diameter	60.935-61.001
		Shell Diameter	

*L = Longitudinal, T = Transversal, H = Horizontal, V = Vertical,
 F = Forward, B = Back, I = Intake, E = Exhaust
 + = Measurements are in mm

APPENDIX C

ENGINE INSPECTION DATA-
PHOTOGRAPHS

USAF Academy Vehicle 79B5659
Lubricant: Green



Piston No. 1 Thrust Side



Anti-Thrust Side

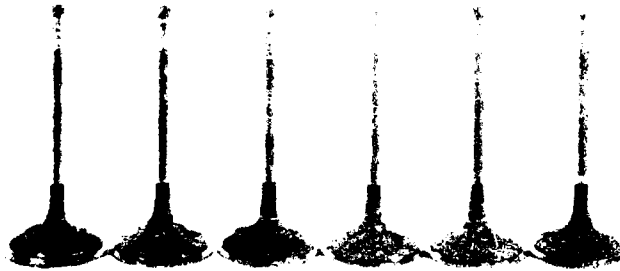


Piston No. 2 Thrust Side

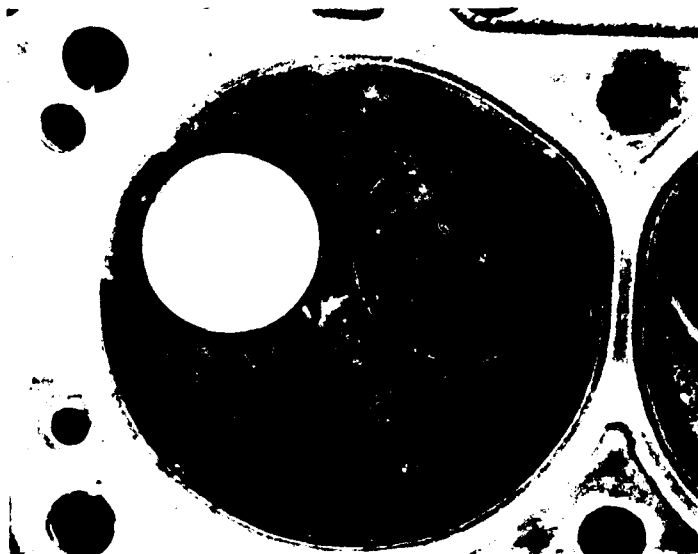


Anti-Thrust Side

USAF Academy Vehicle 79B5659
Lubricant: Green



Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

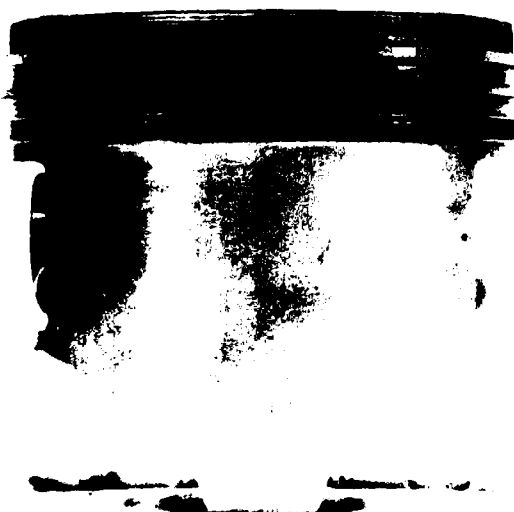
USAF Academy Vehicle 79B5660
Lubricant: Yellow



Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 2 Thrust Side

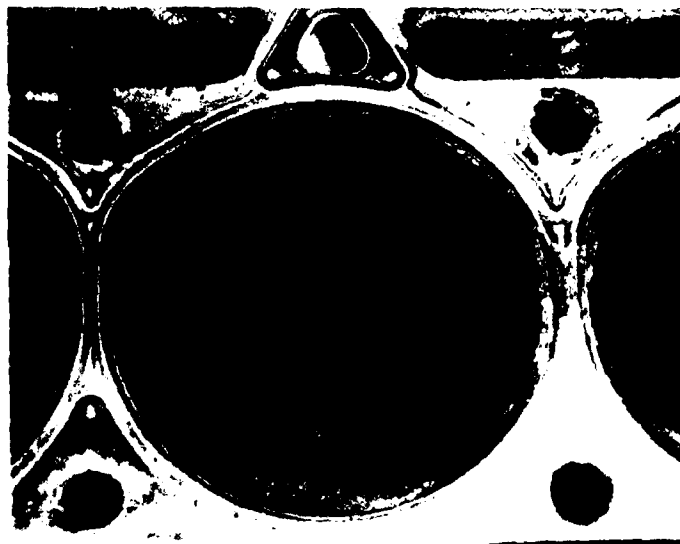


Anti-Thrust Side

USAF Academy Vehicle 79B5660
Lubricant: Yellow

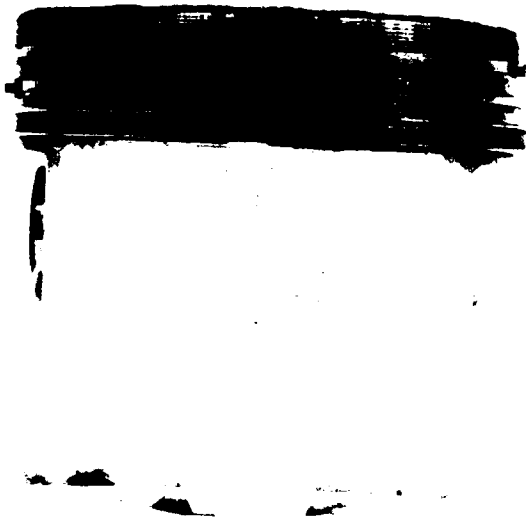


Intake Valves 1-6

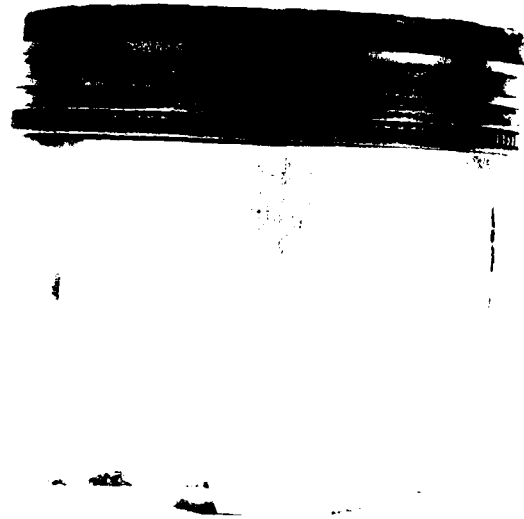


Cylinder Head Combustion Chamber No. 2

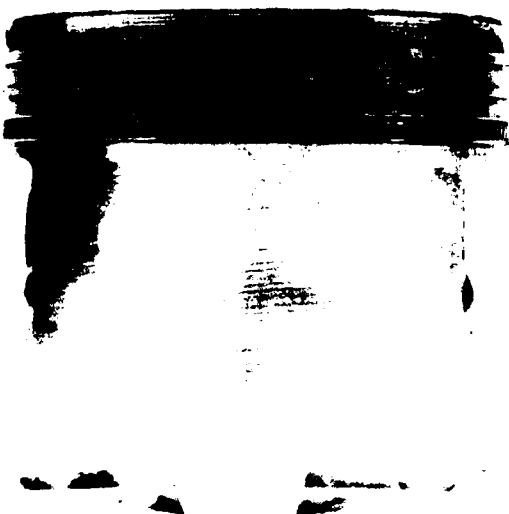
USAF Academy Vehicle 79B5668
Lubricant: Blue(C)



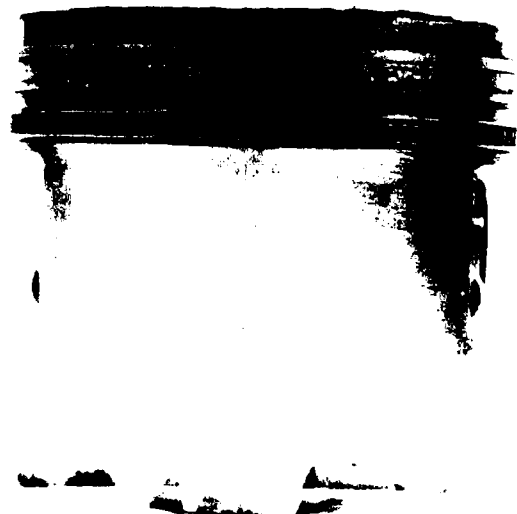
Piston No. 1 Thrust Side



Anti-Thrust Side

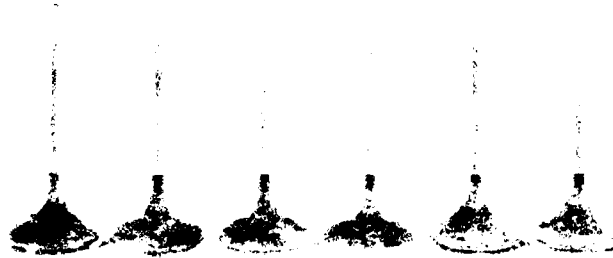


Piston No. 2 Thrust Side

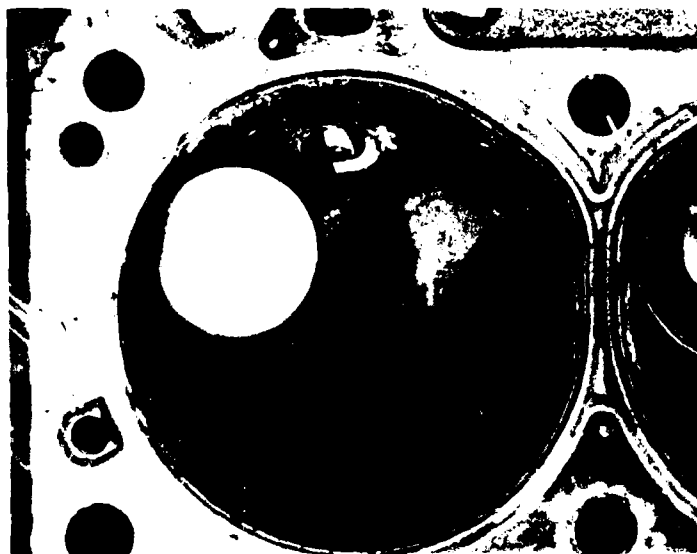


Anti-Thrust Side

USAF Academy Vehicle 79B5668
Lubricant: Blue(C)



Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

George AFB Vehicle 79B2533
Lubricant: Green



Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 3 Thrust Side



Anti-Thrust Side

George AFB Vehicle 79B2533
Lubricant: Green



Piston No. 2 Thrust Side



Anti-Thrust Side

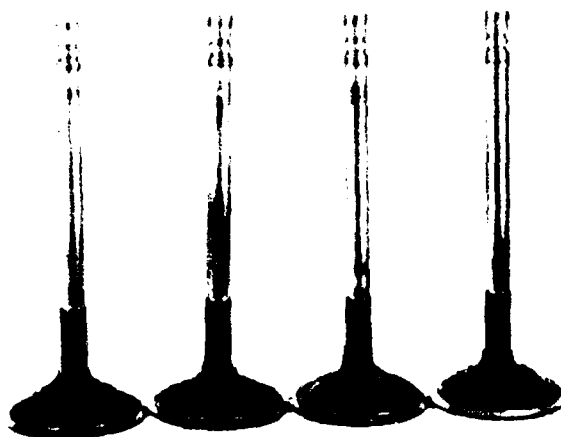


Piston No. 4 Thrust Side

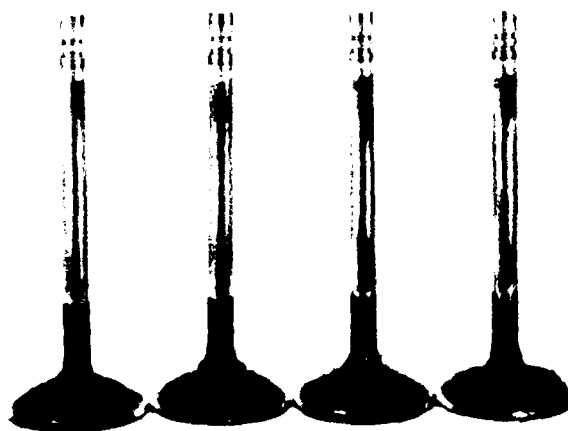


Anti-Thrust Side

George AFB Vehicle 79B2533
Lubricant: Green



Intake Valves 1-4 Left



Intake Valves 1-4 Right

George AFB Vehicle 79B2533
Lubricant: Green



Cylinder Head Combustion Chamber No. 1 Left



Cylinder Head Combustion Chamber No. 1 Right

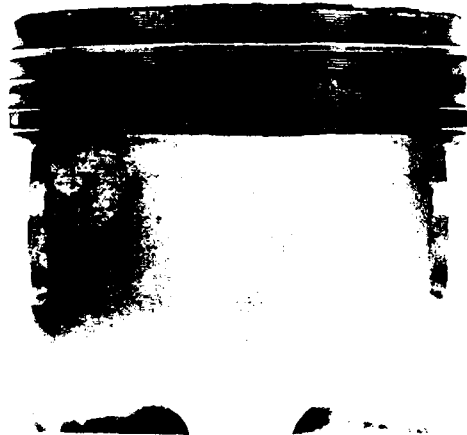
George AFB Vehicle 79B2534
Lubricant: Yellow



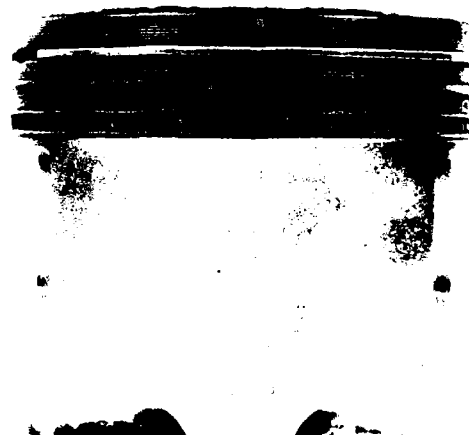
Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 3 Thrust Side

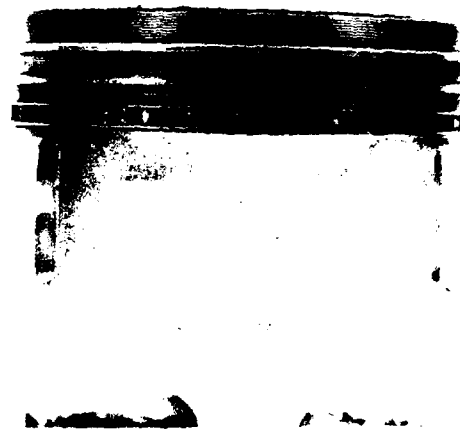


Anti-Thrust Side

George AFB Vehicle 79B2534
Lubricant: Yellow



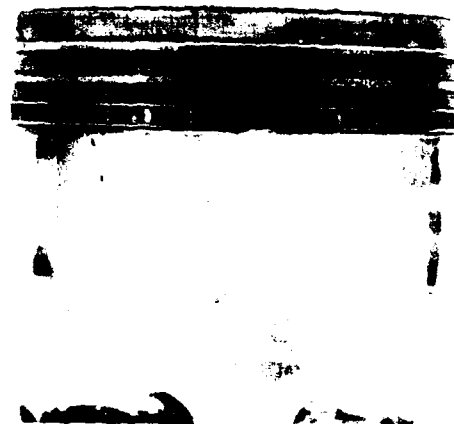
Piston No. 2 Thrust Side



Anti-Thrust Side

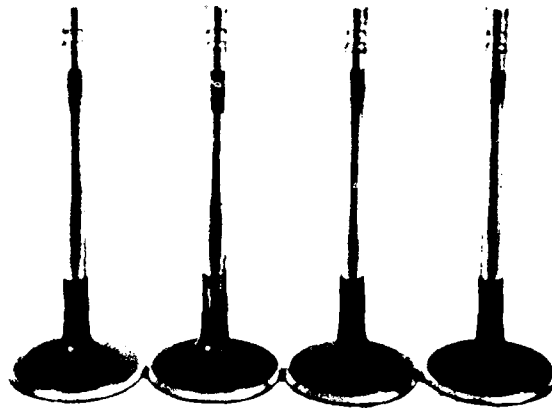


Piston No. 4 Thrust Side

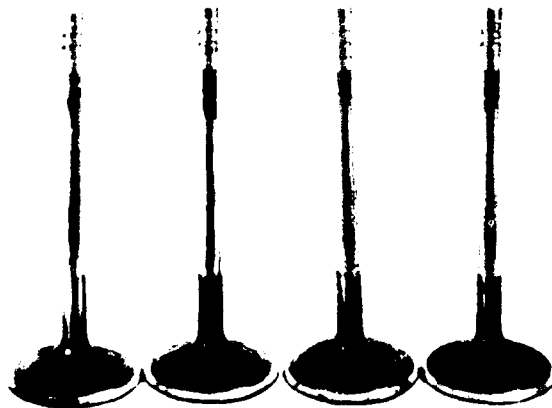


Anti-Thrust Side

George AFB Vehicle 79B2534
Lubricant: Yellow

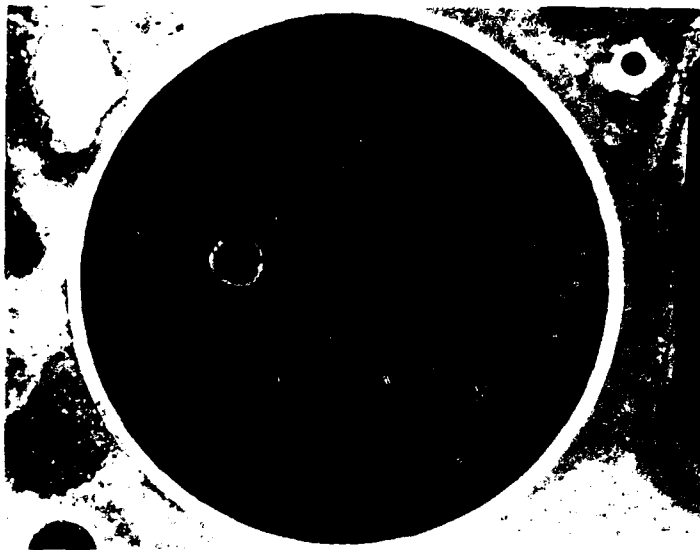


Intake Valves 1-4 Left

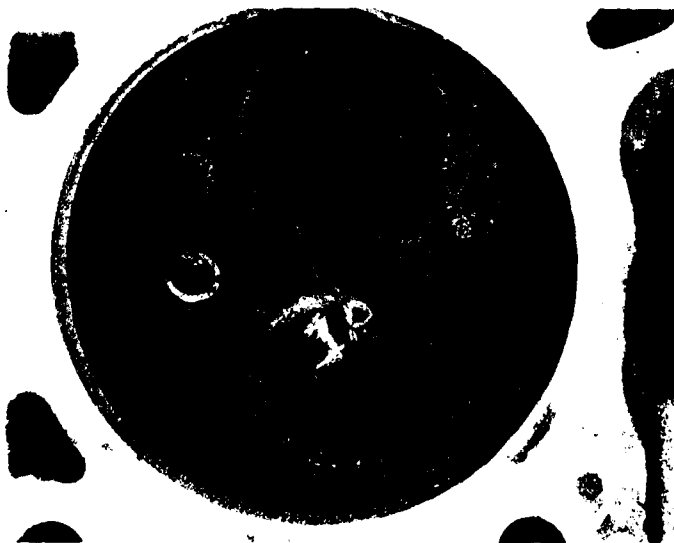


Intake Valves 1-4 Right

George AFB Vehicle 79B2534
Lubricant: Yellow



Cylinder Head Combustion Chamber No. 1 Left



Cylinder Head Combustion Chamber No. 1 Right

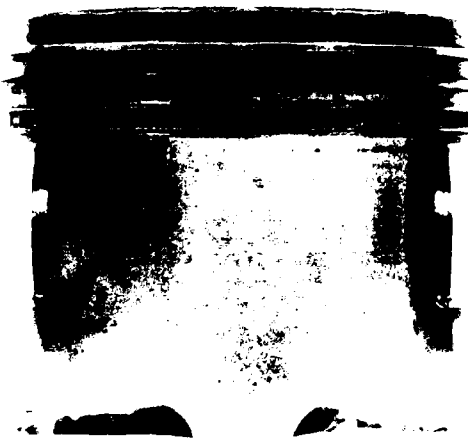
George AFB Vehicle 79B2539
Lubricant: Blue(C)



Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 3 Thrust Side

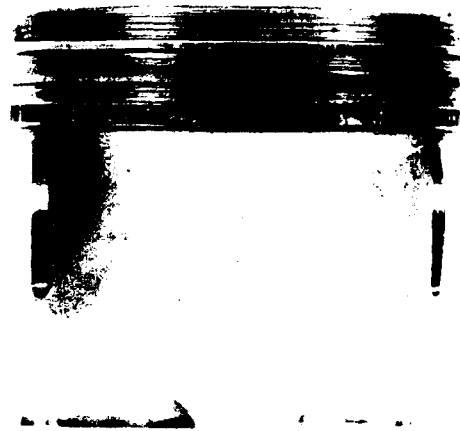


Anti-Thrust Side

George AFB Vehicle 79B2539
Lubricant: Blue(C)



Piston No. 2 Thrust Side



Anti-Thrust Side

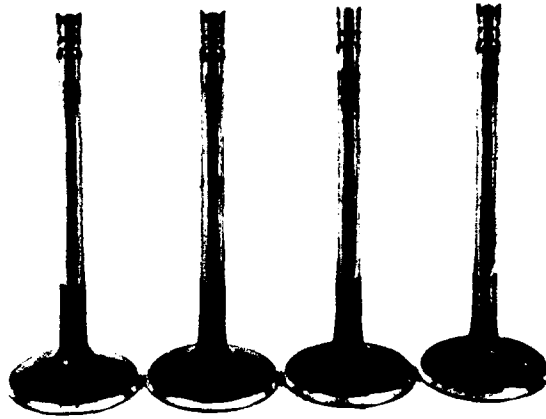


Piston No. 4 Thrust Side

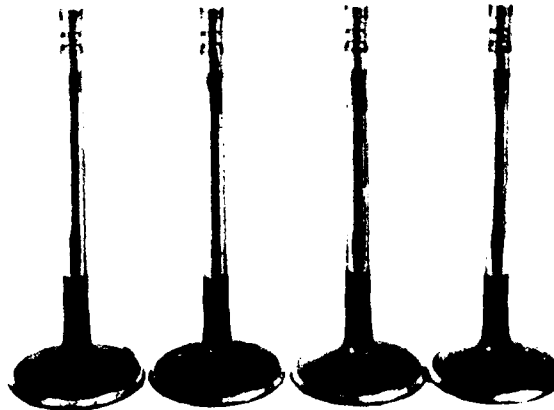


Anti-Thrust Side

George AFB Vehicle 79B2539
Lubricant: Blue(C)



Intake Valves 1-4 Left

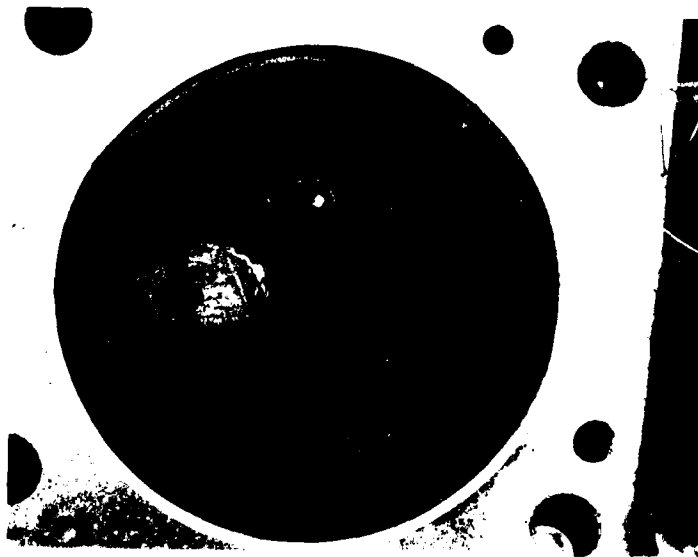


Intake Valves 1-4 Right

George AFB Vehicle 79B2539
Lubricant: Blue(C)

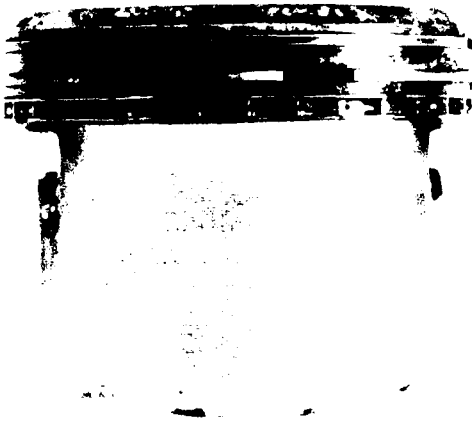


Cylinder Head Combustion Chamber No. 1 Left



Cylinder Head Combustion Chamber No. 1 Right

Grand Forks AFB Vehicle 79B1734
Lubricant: Yellow



Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 3 Thrust Side

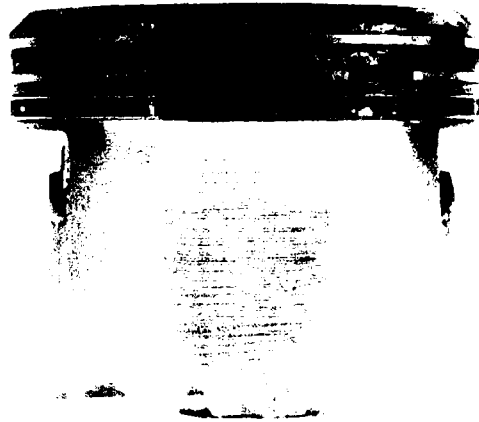


Anti-Thrust Side

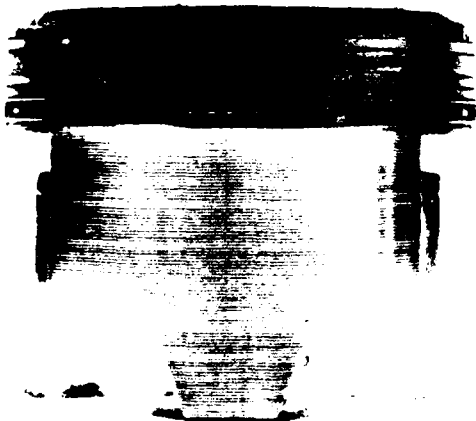
Grand Forks AFB Vehicle 79B1734
Lubricant: Yellow



Piston No. 2 Thrust Side



Anti-Thrust Side

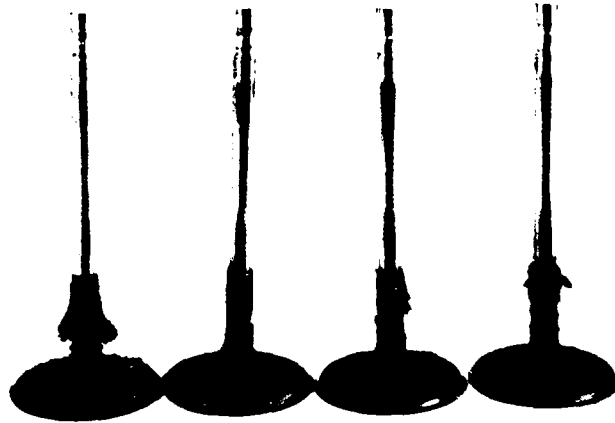


Piston No. 4 Thrust Side

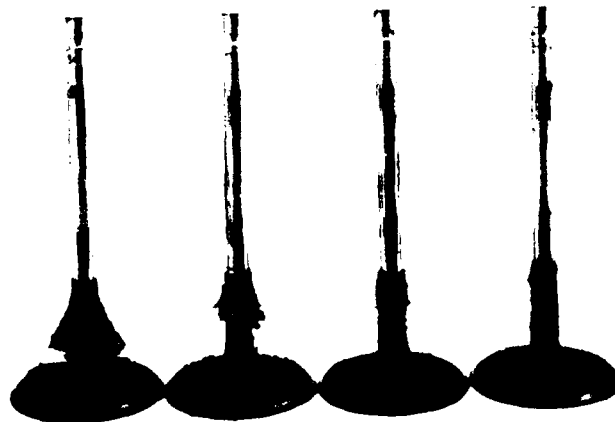


Anti-Thrust Side

Grand Forks AFB Vehicle 79B1734
Lubricant: Yellow

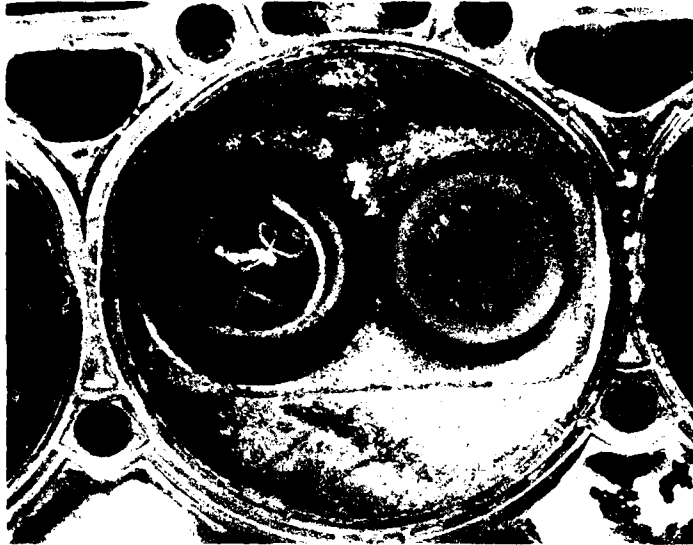


Intake Pistons 1-4 Left

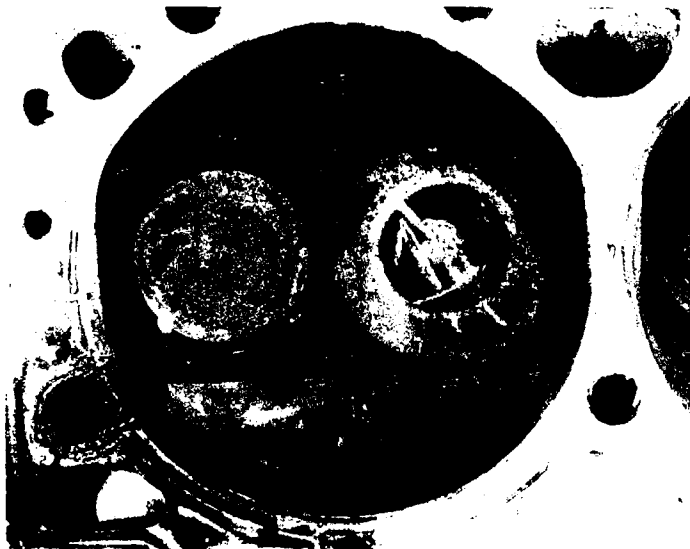


Intake Pistons 1-4 Right

Grand Forks AFB Vehicle 79B1734
Lubricant: Yellow



Cylinder Head Combustion Chamber No. 2 Left

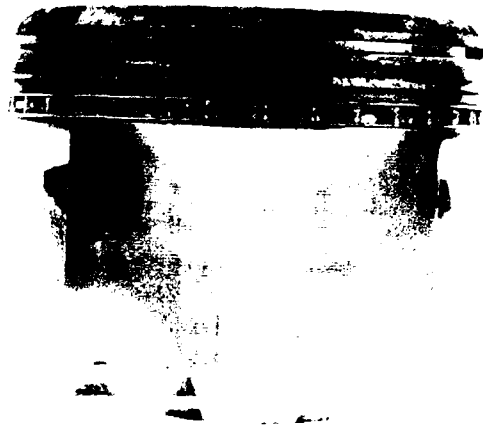


Cylinder Head Combustion Chamber No. 1 Right

Grand Forks AFB Vehicle 79B1735
Lubricant: Blue(B)



Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 3 Thrust Side



Anti-Thrust Side

Grand Forks AFB Vehicle 79B1735
Lubricant: Blue(B)



Piston No. 2 Thrust Side



Anti-Thrust Side



Piston No. 4 Thrust Side



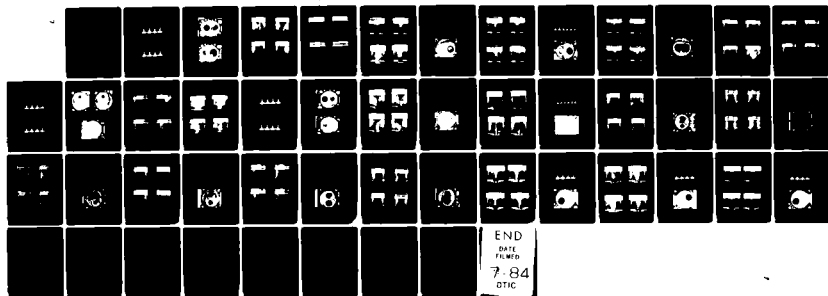
Anti-Thrust Side

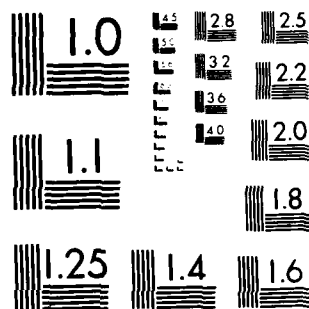
AD-A141 881

INSPECTION DATA FOR SPARK IGNITION ENGINES FROM AIR
FORCE NONTACTICAL VEH..(U) SOUTHWEST RESEARCH INST SAN
ANTONIO TX ARMY FUELS AND LUBRICA... W E BUTLER ET AL.
JAN 83 AFLRL-163-VOL-2 DAAK70-82-C-0001 F/G 11/8 NL

2/2

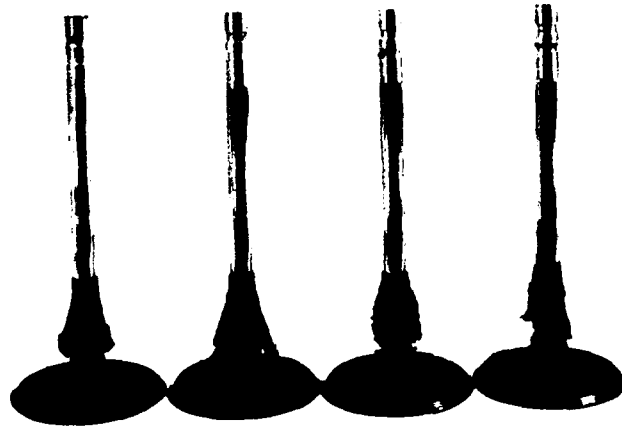
UNCLASSIFIED



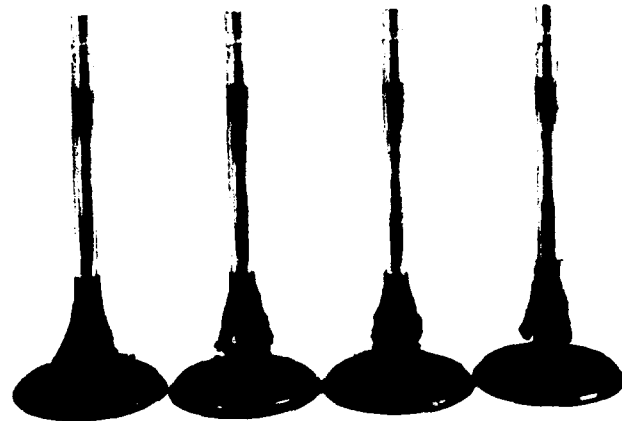


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Grand Forks AFB Vehicle 79B1735
Lubricant: Blue(B)



Intake Valves 1-4 Left

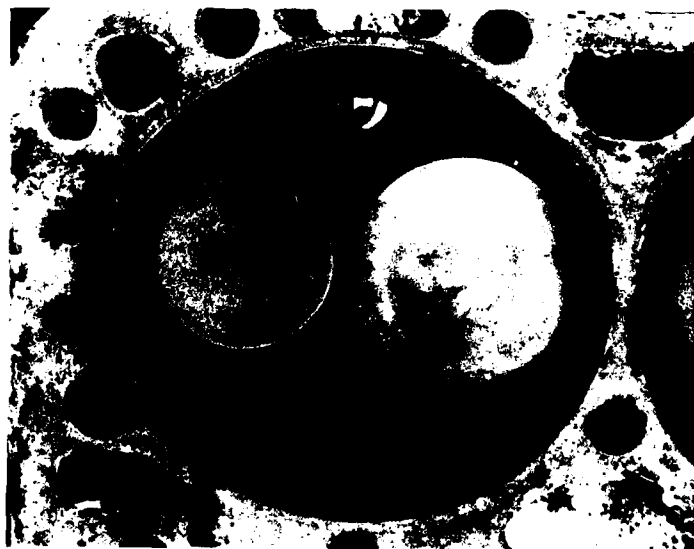


Intake Valves 1-4 Right

Grand Forks AFB Vehicle 79B1735
Lubricant: Blue(B)



Cylinder Head Combustion Chamber No. 1 Left



Cylinder Head Combustion Chamber No. 1 Right

Hancock Field Vehicle 78B5038
Lubricant: Green



Piston No. 1 Thrust Side



Anti-Thrust Side

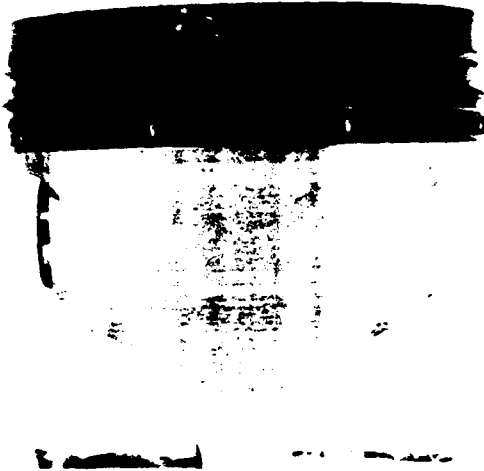


Piston No. 2 Thrust Side

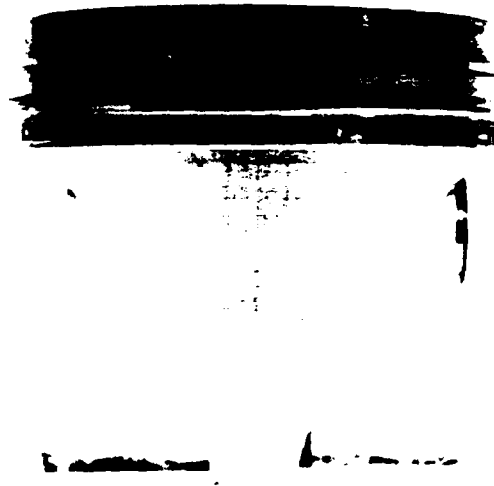


Anti-Thrust Side

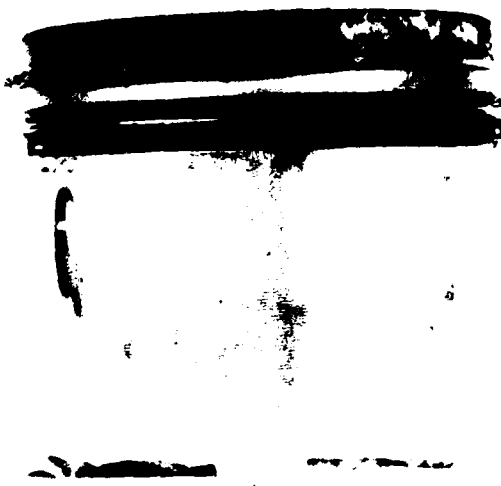
Hancock Field Vehicle 78B5646
Lubricant: Yellow



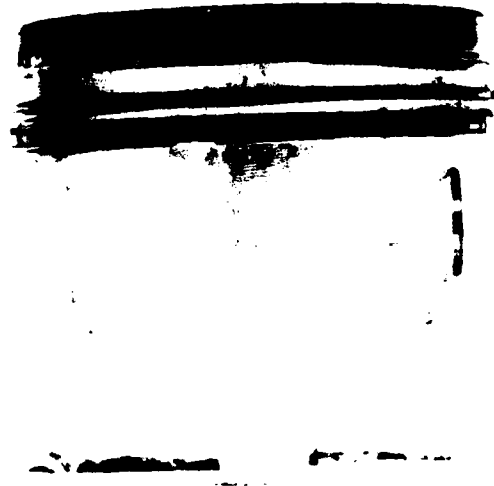
Piston No. 2 Thrust Side



Anti-Thrust Side



Piston No. 4 Thrust Side



Anti-Thrust Side

Lackland AFB Vehicle 79B2270
Lubricant: Yellow



Piston No. 1 Thrust Side



Anti-Thrust Side

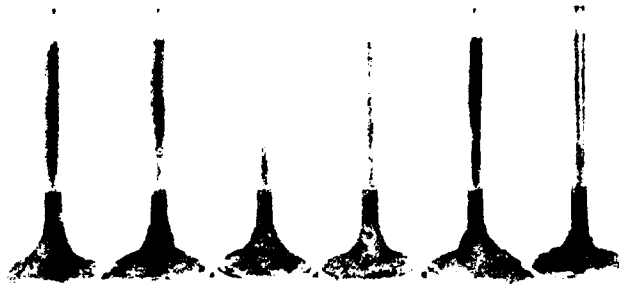


Piston No. 2 Thrust Side

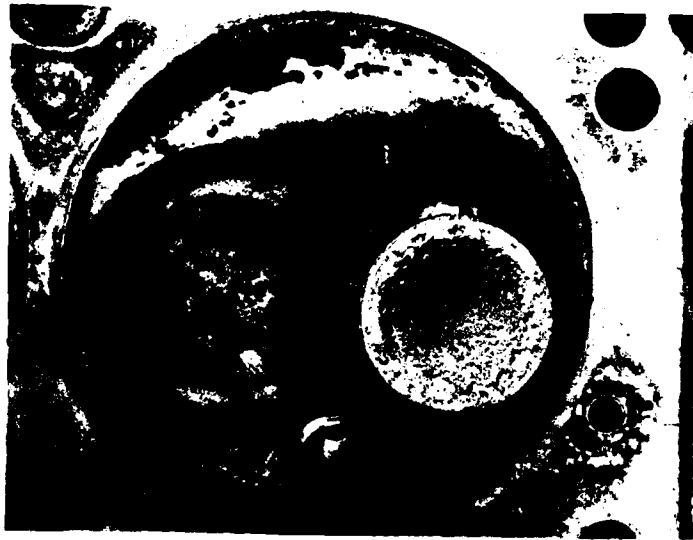


Anti-Thrust Side

Lackland AFB Vehicle 79B2270
Lubricant: Yellow

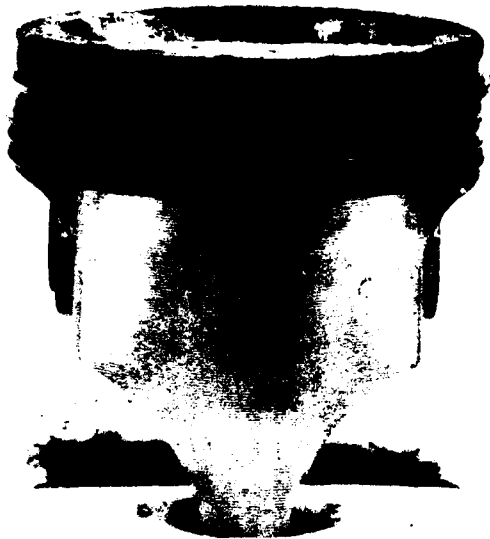


Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

Lackland AFB Vehicle 79B2271
Lubricant: Green



Piston No. 1 Thrust Side



Anti-Thrust Side

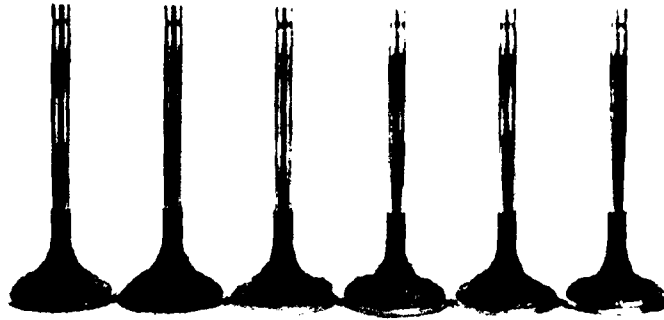


Piston No. 2 Thrust Side



Anti-Thrust Side

Lackland AFB Vehicle 79B2271
Lubricant: Green



Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

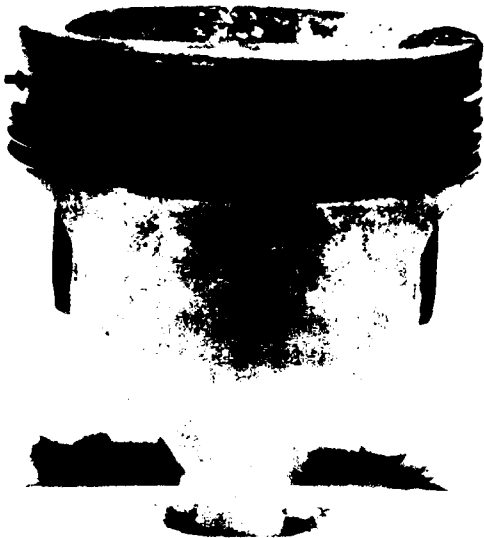
Lackland AFB Vehicle 79B2272
Lubricant: Blue(A)



Piston No. 1 Thrust Side



Anti-Thrust Side

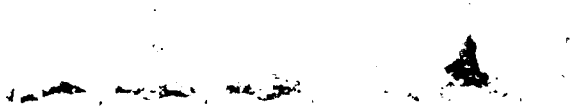


Piston No. 2 Thrust Side



Anti-Thrust Side

Lackland AFB Vehicle 79B2272
Lubricant: Blue (A)



Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

Minot AFB Vehicle 79B1736
Lubricant: Green



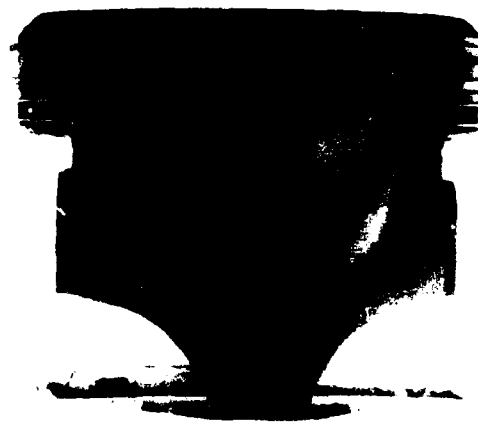
Piston No. 1 Thrust Side



Anti-Thrust Side



Piston No. 3 Thrust Side

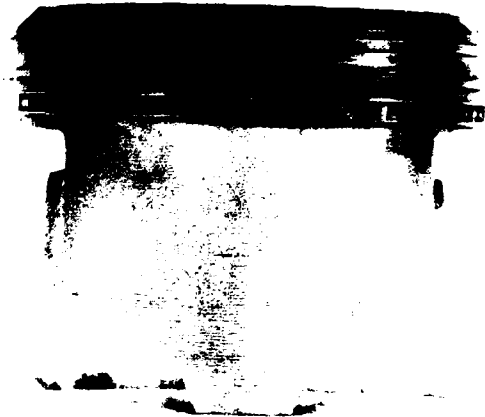


Anti-Thrust Side

Minot AFB Vehicle 79B1736
Lubricant: Green



Piston No. 2 Thrust Side



Anti-Thrust Side

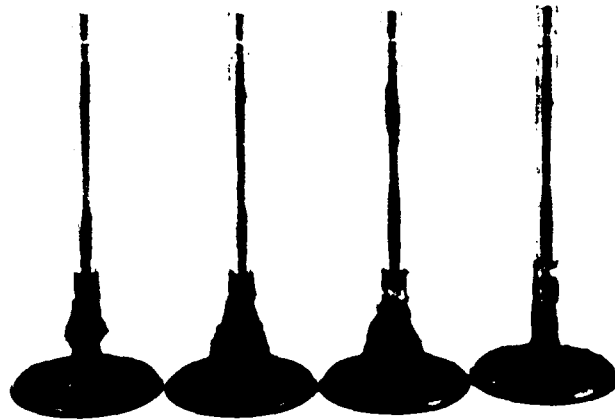


Piston No. 4 Thrust Side

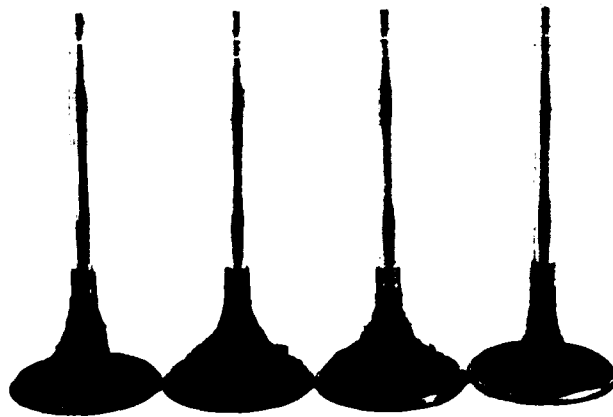


Anti-Thrust Side

Minot AFB Vehicle 79B1736
Lubricant: Green

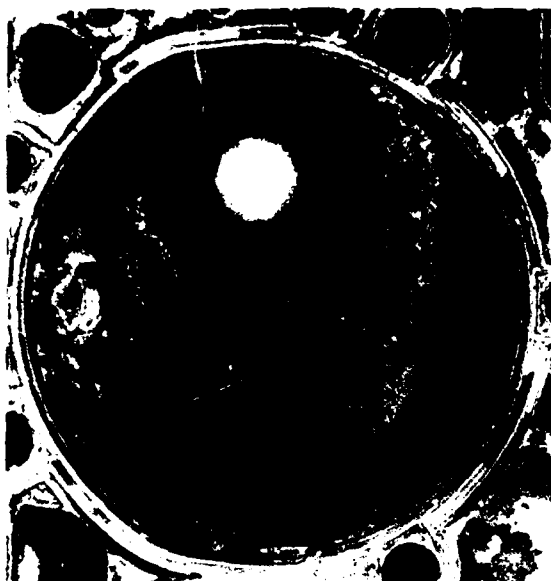


Intake Valves 1-4 Left

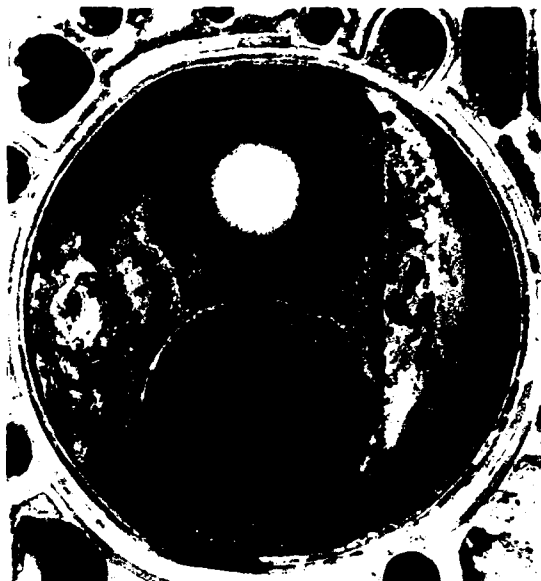


Intake Valves 1-4 Right

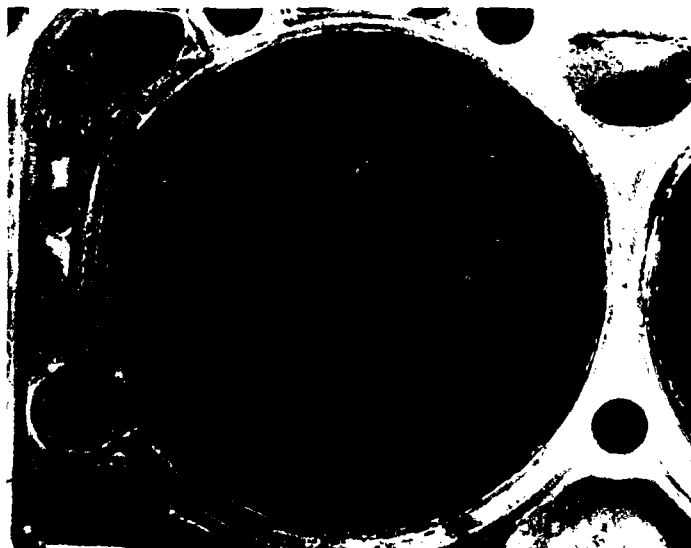
Minot AFB Vehicle 79B1736
Lubricant: Green



Cylinder Head Combustion Chamber
No. 4 Right

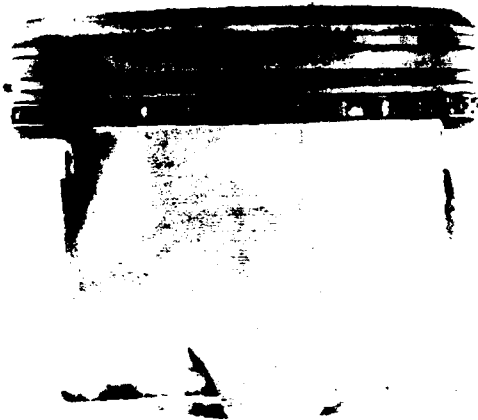


Cylinder Head Combustion Chamber
No. 4 Right w/o Intake Valve



Cylinder Head Combustion Chamber No. 4 Left

Minot AFB Vehicle 79B1759
Lubricant: Blue(C)



Piston No. 1 Thrust Side



Anti-Thrust Side

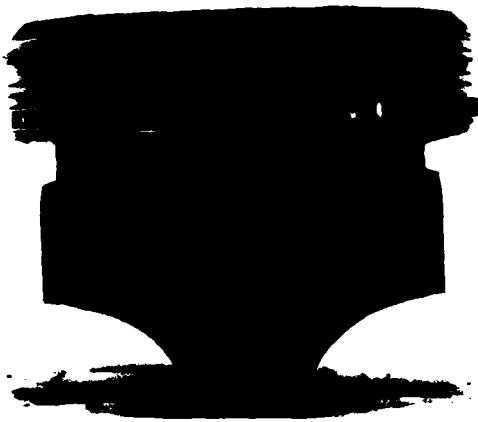


Piston No. 3 Thrust Side

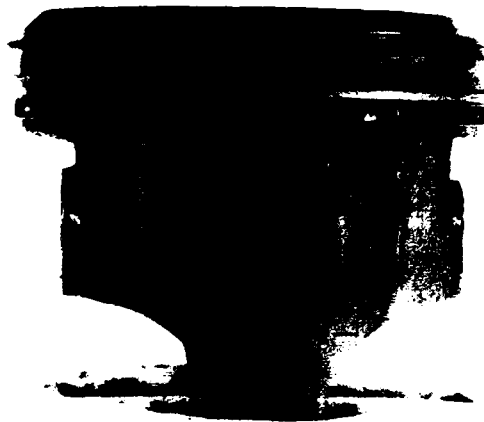


Anti-Thrust Side

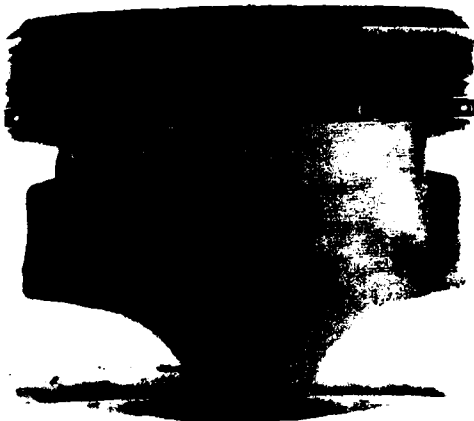
Minot AFB Vehicle 79B1759
Lubricant: Blue(C)



Piston No. 2 Thrust Side



Anti-Thrust Side

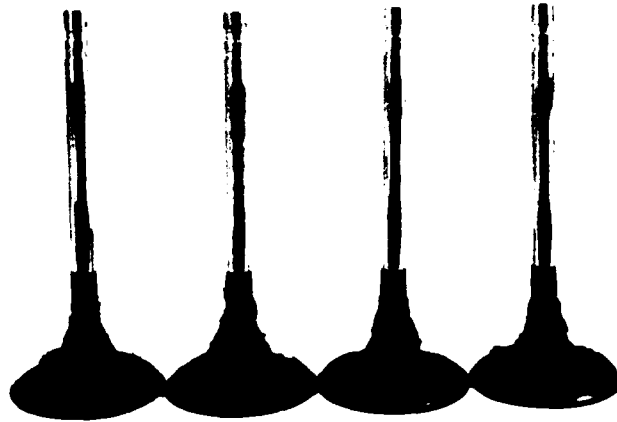


Piston No. 4 Thrust Side

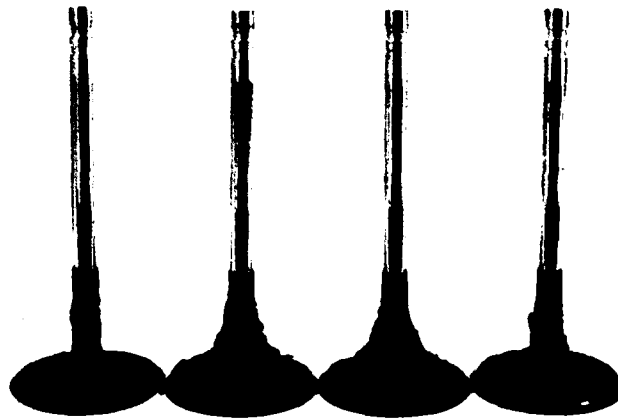


Anti-Thrust Side

Minot AFB Vehicle 79B1759
Lubricant: Blue(C)

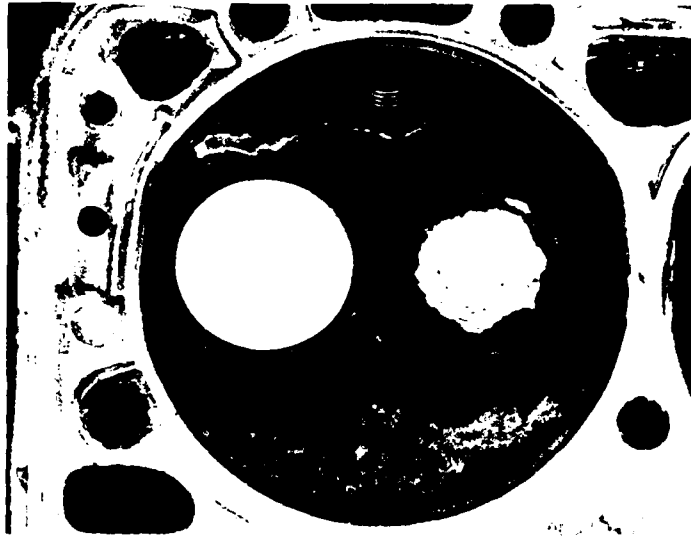


Intake Valves 1-4 Left

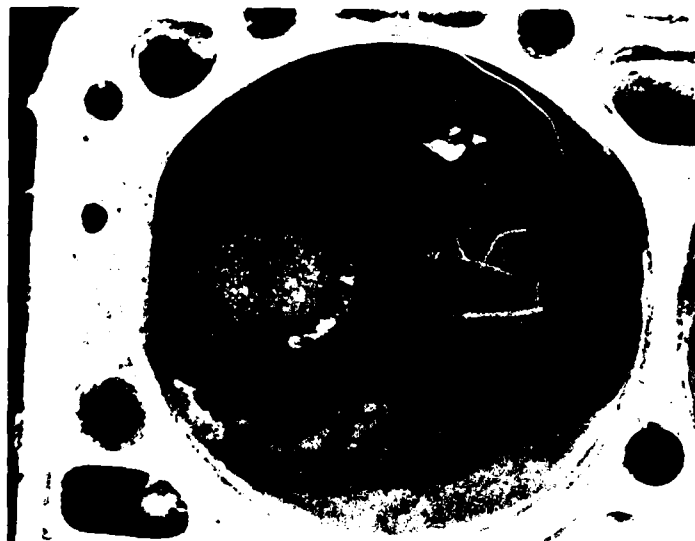


Intake Valves 1-4 Right

Minot AFB Vehicle 79B1759
Lubricant: Blue(C)



Cylinder Head Combustion Chamber No. 1 Left



Cylinder Head Combustion Chamber No. 1 Right

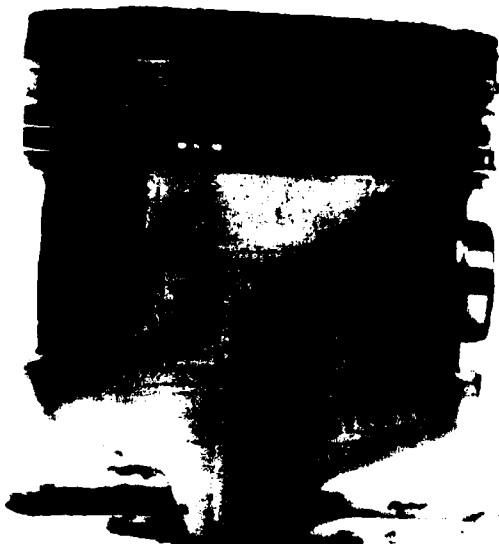
Myrtle Beach Vehicle 79B5212
Lubricant: Green



Piston No. 2 Thrust Side



Anti-Thrust Side



Piston No. 4 Thrust Side



Anti-Thrust Side

Myrtle Beach Vehicle 79B5212
Lubricant: Green



Intake Valves 1-6

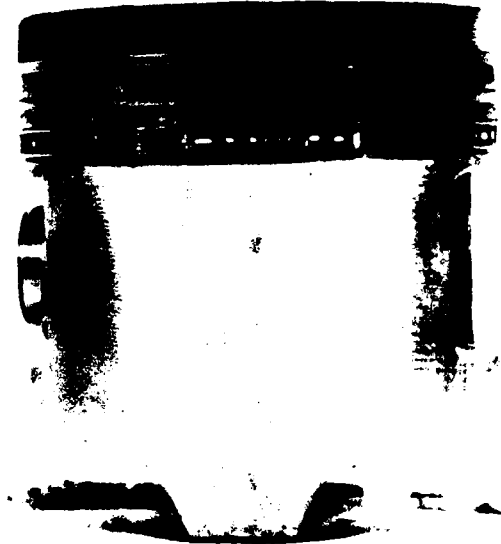


Cylinder Head Combustion Chamber No. 1

Myrtle Beach Vehicle 78B9187
Lubricant: Yellow



Piston No. 2 Thrust Side



Anti-Thrust Side

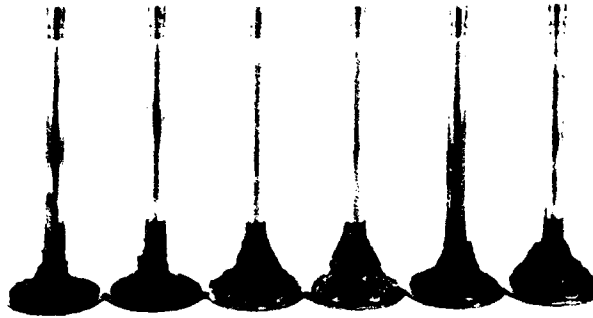


Piston No. 4 Thrust Side

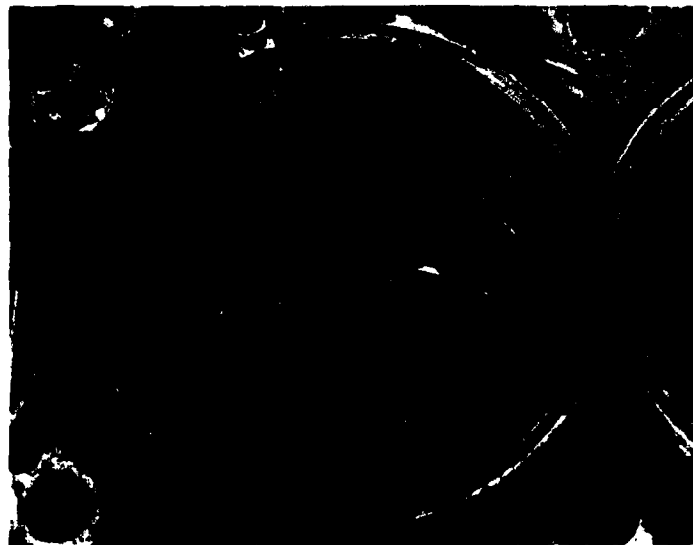


Anti-Thrust Side

Myrtle Beach Vehicle 78B9187
Lubricant: Yellow



Intake Valves 1-6

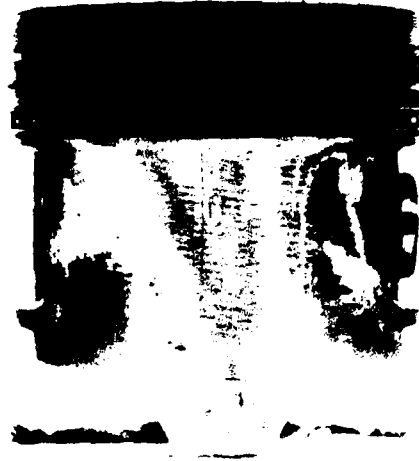


Cylinder Head Combustion Chamber No. 1

Myrtle Beach Vehicle 78B9188
Lubricant: Blue(D)



Piston No. 2 Thrust Side



Anti-Thrust Side



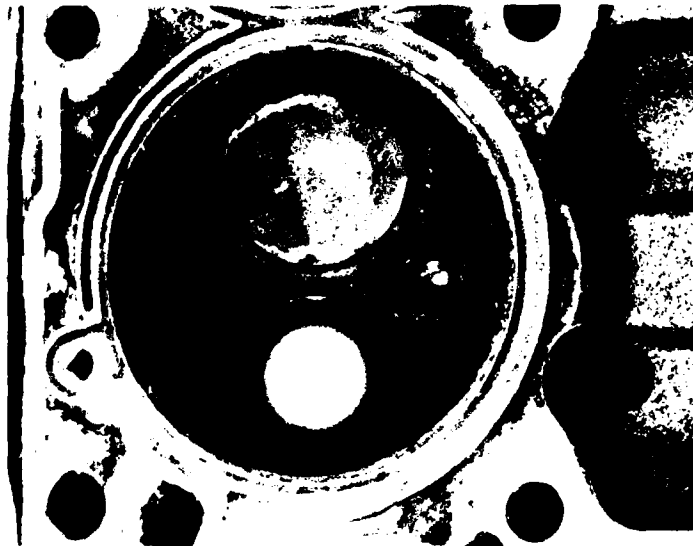
Piston No. 4 Thrust Side



Anti-Thrust Side

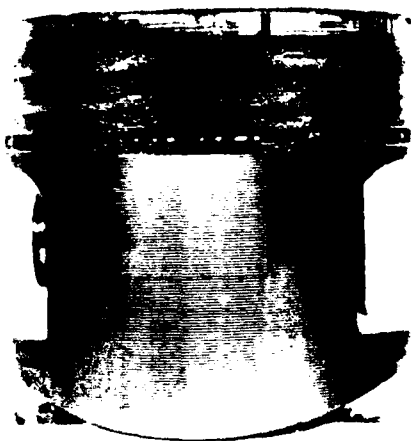
Myrtle Beach Vehicle 78B9188
Lubricant: Blue(D)

Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

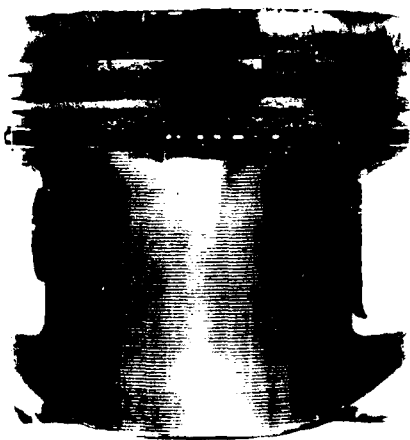
Offutt AFB Vehicle 78B4766
Lubricant: Green



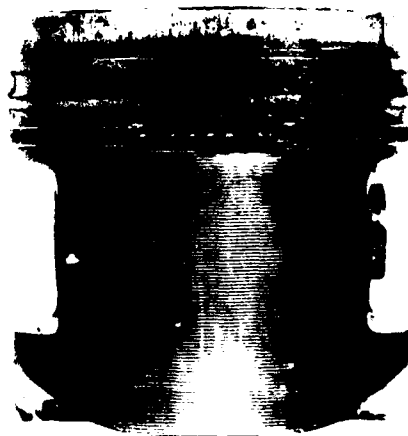
Piston No. 2 Thrust Side



Anti-Thrust Side



Piston No. 4 Thrust Side

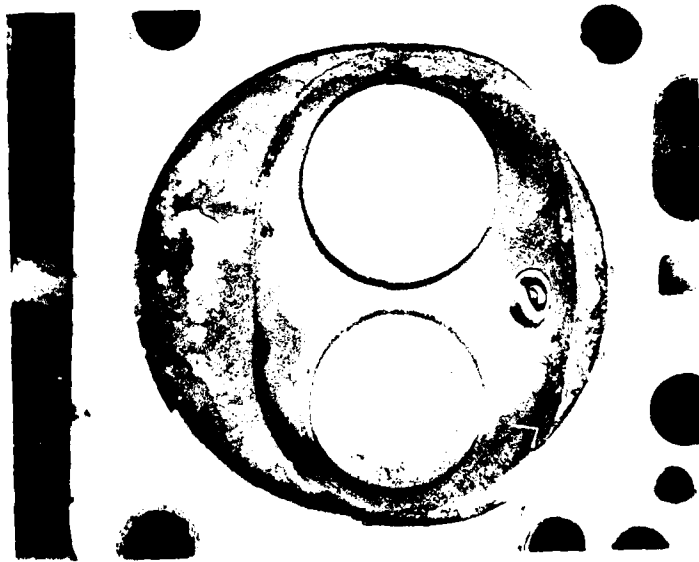


Anti-Thrust Side

Offutt AFB Vehicle 78B4766
Lubricant: Green



Intake Valves 1-6

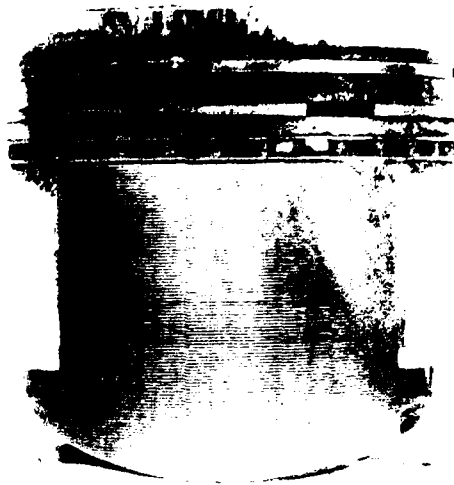


Cylinder Head Combustion Chamber No. 1

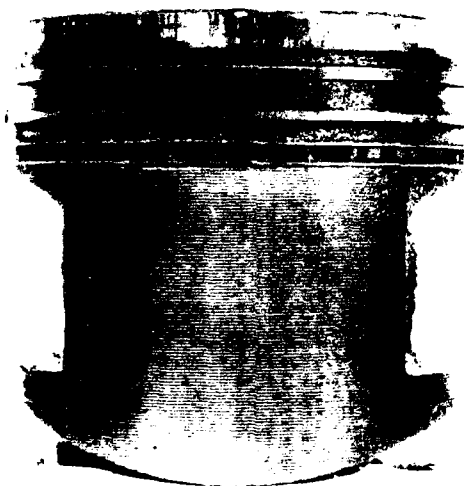
Offutt AFB Vehicle 78B4768
Lubricant: Blue(B)



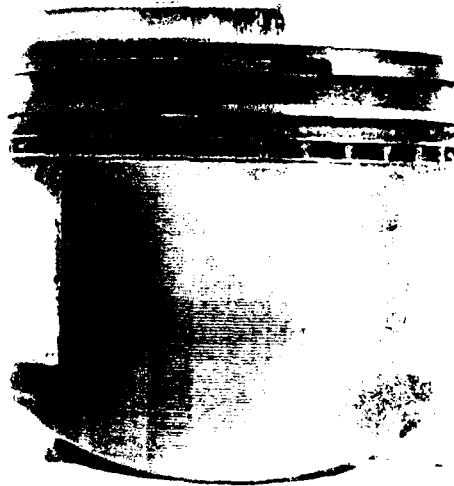
Piston No. 2 Thrust Side



Anti-Thrust Side

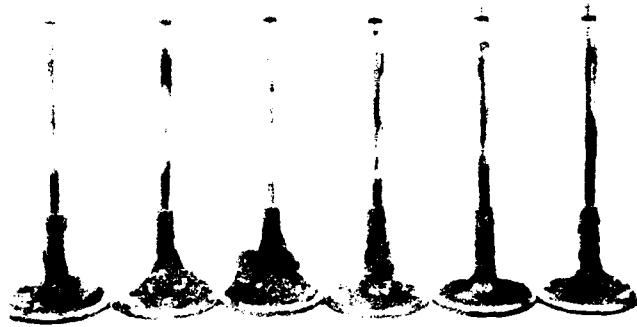


Piston No. 4 Thrust Side

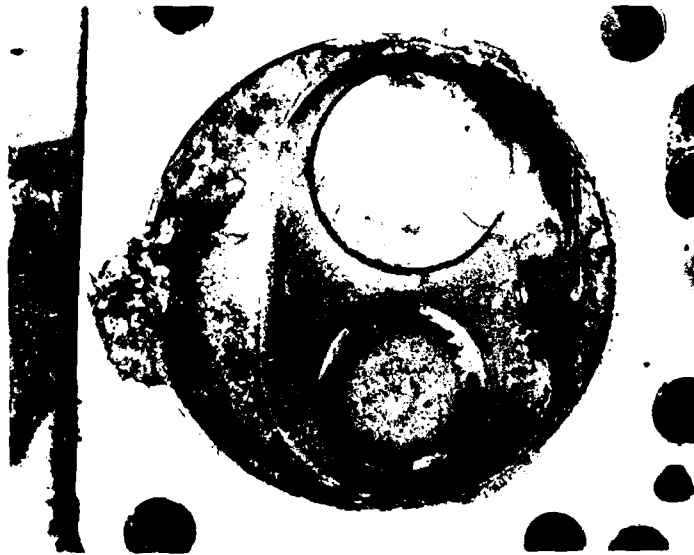


Anti-Thrust Side

Offutt AFB Vehicle 78B4768
Lubricant: Blue(B)



Intake Valves 1-6

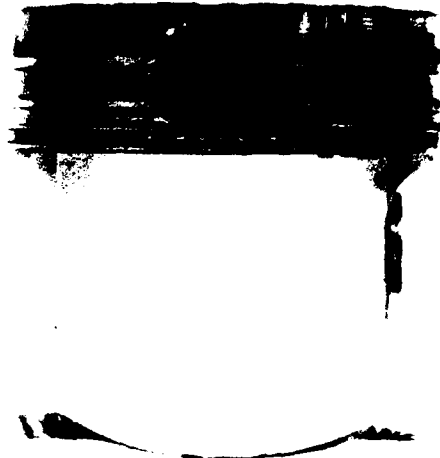


Cylinder Head Combustion Chamber No. 1

Peterson Field Vehicle 78B4569
Lubricant: Green



Piston No. 2 Thrust Side



Anti-Thrust Side

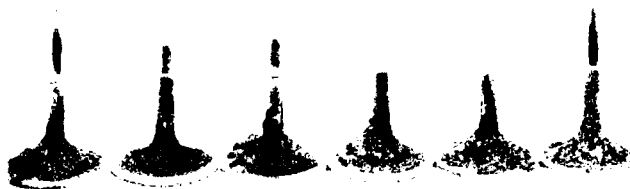


Piston No. 4 Thrust Side

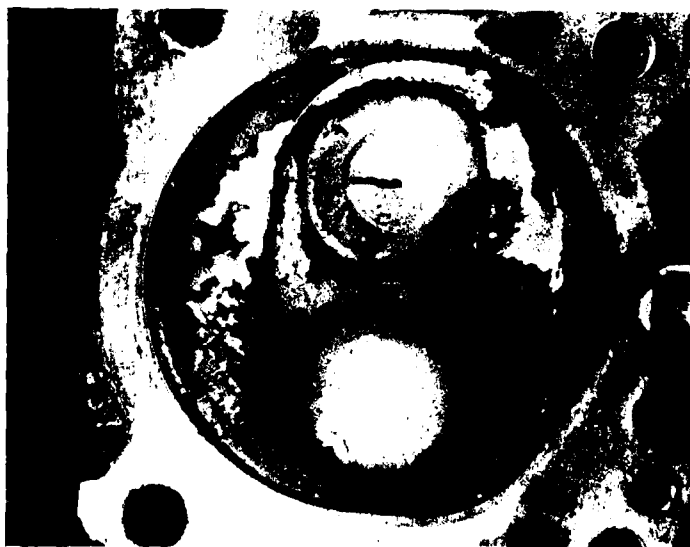


Anti-Thrust Side

Peterson Field Vehicle 78B4569
Lubricant: Green



Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

Peterson Field Vehicle 78B4571
Lubricant: Yellow



Piston No. 2 Thrust Side



Anti-Thrust Side

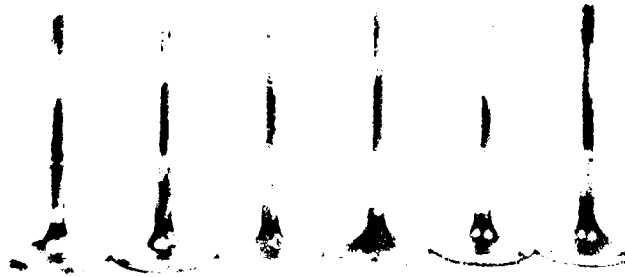


Piston No. 4 Thrust Side

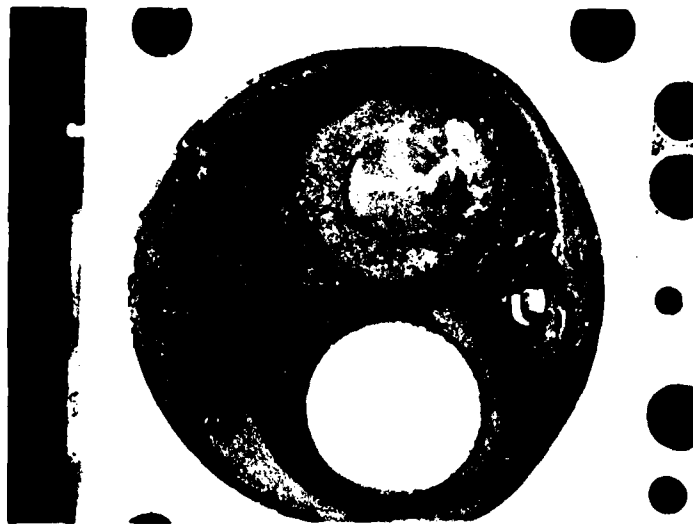


Anti-Thrust Side

Peterson Field Vehicle 78B4571
Lubricant: Yellow



Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

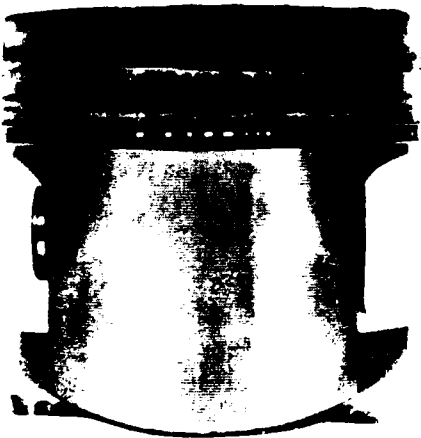
Peterson Field Vehicle 78B8831
Lubricant: Blue(C)



Piston No. 2 Thrust Side



Anti-Thrust Side



Piston No. 4 Thrust Side

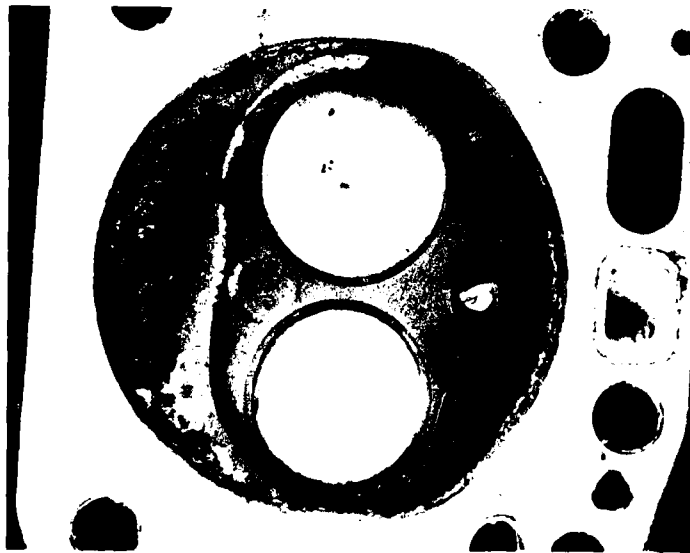


Anti-Thrust Side

Peterson Field Vehicle 78B8831
Lubricant: Blue(C)

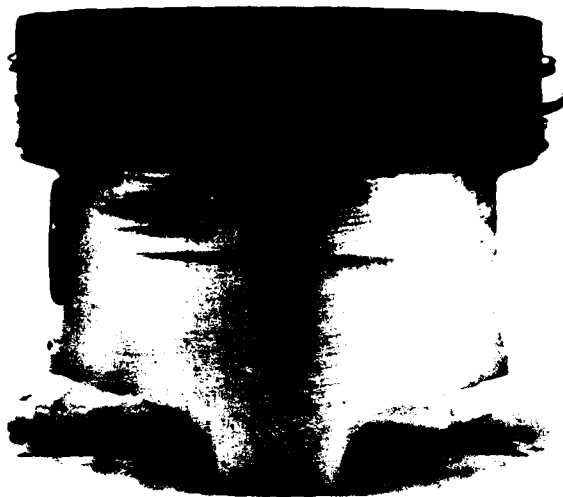


Intake Valves 1-6



Cylinder Head Combustion Chamber No. 1

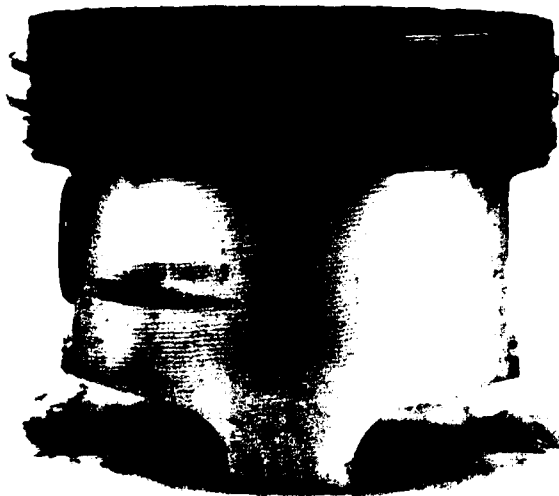
Randolph AFB Vehicle 79B5719
Lubricant: Yellow



Piston No. 1 Thrust Side



Anti-Thrust Side

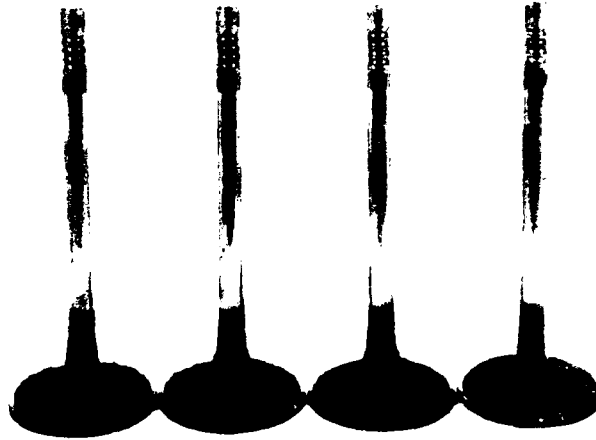


Piston No. 2 Thrust Side



Anti-Thrust Side

Randolph AFB Vehicle 79B5719
Lubricant: Yellow



Intake Valves 1-4



Cylinder Head Combustion Chamber No. 1

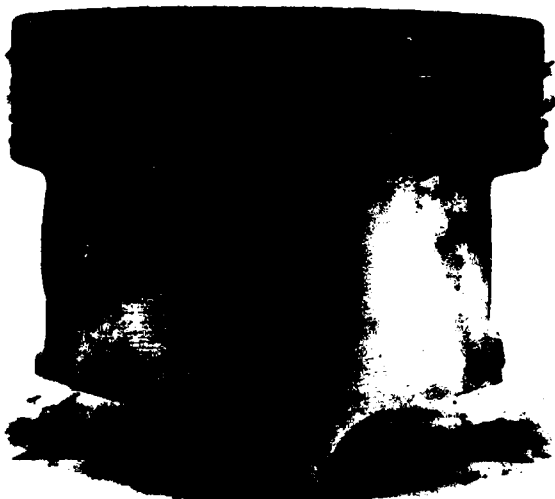
Randolph AFB Vehicle 79B5720
Lubricant: Blue(A)



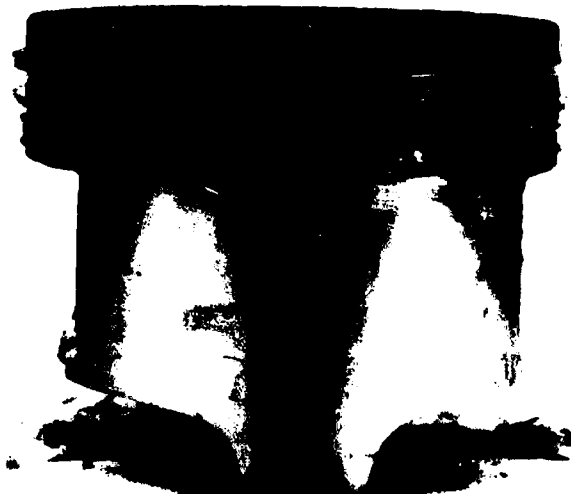
Piston No. 1 Thrust Side



Anti-Thrust Side

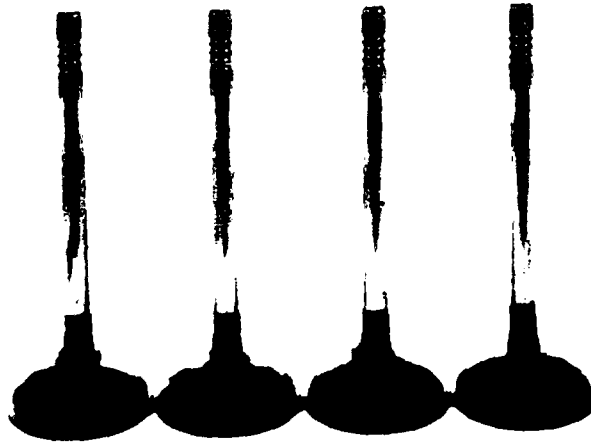


Piston No. 2 Thrust Side

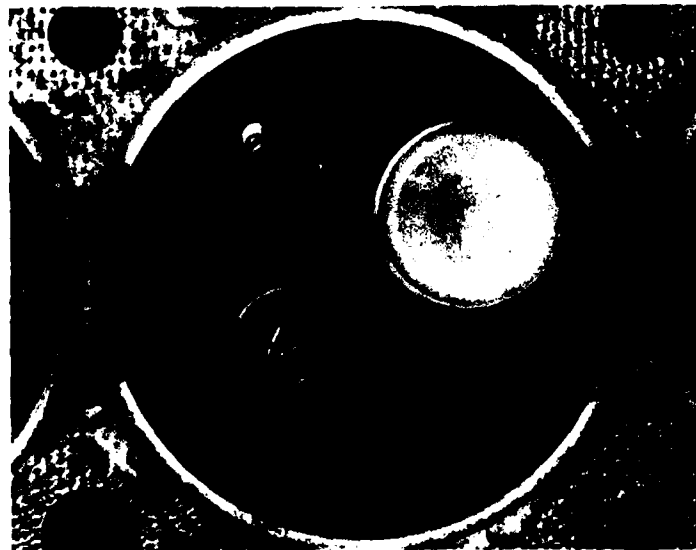


Anti-Thrust Side

Randolph AFB Vehicle 79B5720
Lubricant: Blue(A)



Intake Valves 1-4

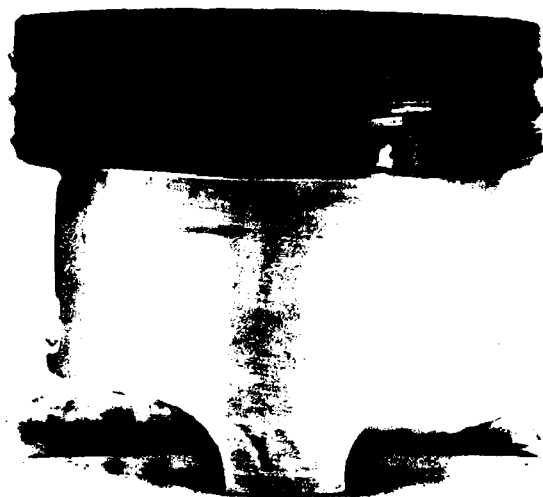


Cylinder Head Combustion Chamber No. 3

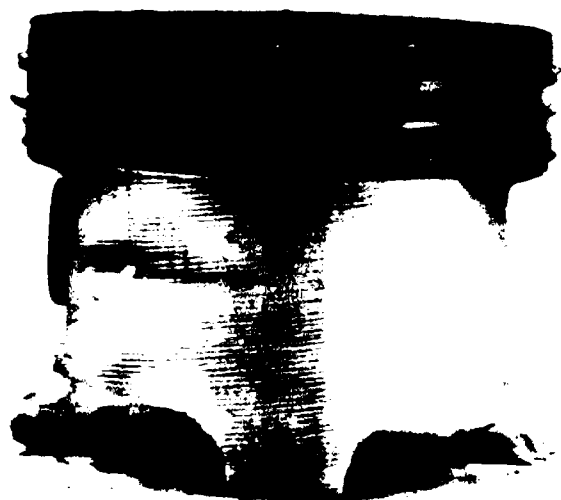
Randolph AFB Vehicle 79B5721
Lubricant: Green



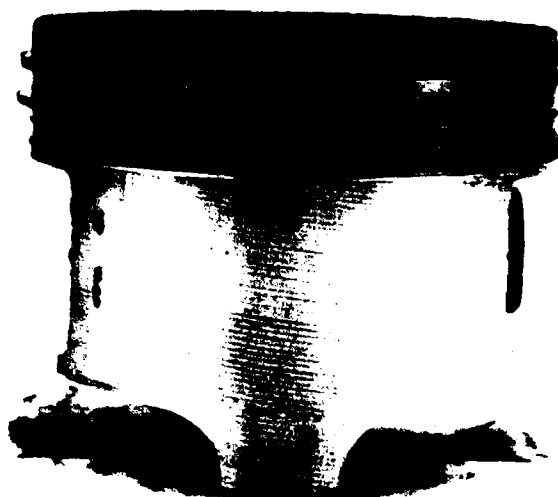
Piston No. 1 Thrust Side



Anti-Thrust Side

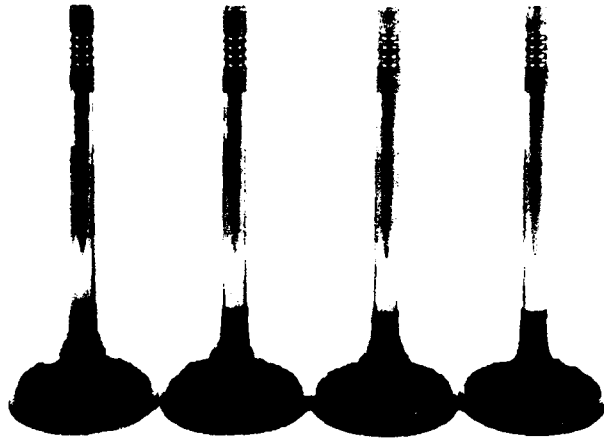


Piston No. 2 Thrust Side

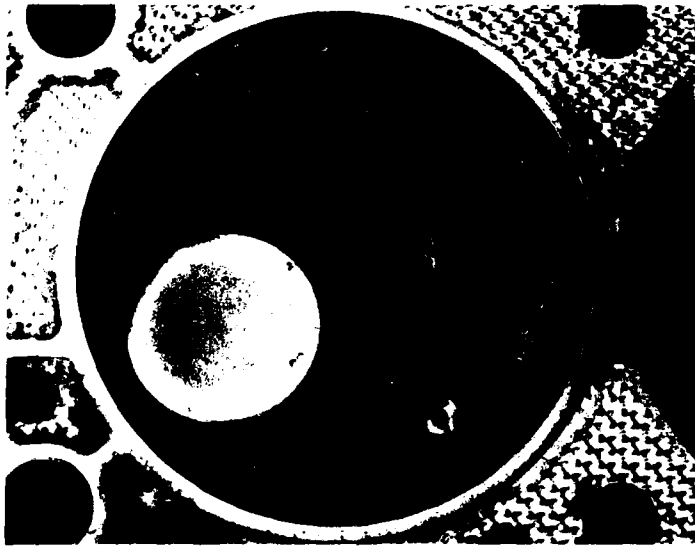


Anti-Thrust Side

Randolph AFB Vehicle 79B5721
Lubricant: Green



Intake Valves 1-4



Cylinder Head Combustion Chamber No. 1

APPENDIX D

LUBRICANT ANALYSES DATA-
MEANS AND STANDARD DEVIATIONS

APPENDIX D
LUBRICANT ANALYSES DATA - MEANS AND STANDARD DEVIATIONS

Wear Metals & Additives	YELLOW										
	78B4571	79B2534	79B5660	78B9187	79B5719	79B2270	78B5646	79B1734	$\bar{X}$	$S_{\bar{X}}$	
Fe	561.86	47.0	203.30	118.68	81.25	572.80	113.10	86.94	223.12	217.16	
Al	12.43	6.14	9.70	15.41	7.75	88.20	15.40	7.81	20.36	27.64	
Cr	14.00	3.57	2.90	7.50	1.25	109.20	18.70	5.63	20.34	36.39	
Cu	16.71	5.14	8.30	12.27	11.75	22.40	20.70	6.69	13.00	6.41	
Mg	292.14	210.43	107.20	73.27	27.00	56.40	217.90	82.00	133.29	94.47	
Na	44.00	39.00	39.70	35.95	41.25	32.00	130.40	488.13	106.30	157.63	
Pb	998.00	31.86	58.70	72.18	64.00	998.00	768.10	109.13	387.50	448.24	
Si	56.86	19.43	20.60	28.32	27.75	34.40	23.10	32.31	30.35	11.96	
Sn	7.57	0.00	4.30	1.14	13.75	10.20	10.50	4.13	6.45	4.85	
B	26.00	22.43	8.90	9.77	11.00	9.00	90.60	113.00	36.34	41.35	
Ba	92.14	102.43	202.2	99.0	123.25	145.6	65.10	149.56	122.41	42.75	
Ca	12.43	0.43	1.30	2.91	4.25	0.60	0.60	11.94	4.31	5.04	
Mn	51.43	0.86	4.90	2.73	8.25	15.40	7.30	9.75	12.58	16.32	
Mo	7.14	0.29	6.60	7.55	5.00	0.60	1.60	5.44	4.28	2.99	
Zn	998.00	995.14	998.0	988.18	998.0	998.00	948.00	998.00	990.17	17.38	
Ni	4.14	0.57	0.70	0.45	0.25	3.80	0.70	0.38	1.37	1.61	
V	0.57	0.14	0.10	0.59	0.50	0.20	0.00	0.31	0.30	0.23	
OTHER DETERMINATIONS											
T(°F)	73.56	72.96	74.01	74.03	73.08	73.48	74.80	73.47	73.67	0.59	
VDP*	119.14	154.14	113.80	108.22	134.00	101.60	102.00	175.60	126.06	26.72	
Particulates**	0.32	0.08	0.14	0.25	0.04	0.13	0.23	0.02	0.15	0.11	

* Viscosity Density Product (Centipoises x g/cm³)

** Total solids in mL

APPENDIX D
LUBRICANT ANALYSES DATA - MEANS AND STANDARD DEVIATIONS
(CONT'D)

Wear Metals & Additives	BLUE										
	78B8831	78B4768	79B2539	79B5668	78B9188	79B5720	79B2272	79B1759	79B1735	$\bar{X}$	$S_{\bar{X}}$
Fe	517.50	619.54	189.17	71.90	58.24	149.17	365.38	72.06	41.25	231.58	216.79
Al	11.67	8.54	14.5	8.00	8.95	8.33	100.75	13.47	11.95	20.68	30.12
Cr	18.83	16.00	12.00	2.70	2.24	2.33	106.63	5.47	3.40	18.84	33.54
Cu	9.83	6.85	5.83	8.50	6.81	5.69	20.00	4.65	4.05	8.02	4.84
Mg	779.17	618.42	488.0	533.80	86.43	11.00	126.25	648.12	350.40	404.62	275.12
Na	38.17	19.77	23.00	22.80	25.52	25.00	19.13	20.24	132.30	36.21	36.48
Pb	998.0	998.00	35.00	37.40	70.14	35.50	998.00	63.18	60.90	366.24	473.99
Si	30.17	26.85	15.17	14.40	8.52	11.50	24.75	24.47	11.40	18.58	7.96
Sn	9.33	3.77	7.33	5.90	0.57	8.67	13.00	8.00	3.20	6.64	3.73
B	56.67	35.54	40.50	73.5	2.00	3.50	6.13	85.88	60.70	40.49	31.37
Ba	3.50	7.08	198.00	17.60	65.05	3.50	12.13	71.12	6.80	42.75	63.86
Ca	0.83	0.92	0.17	0.80	2.05	1.50	0.63	7.59	3.50	2.00	2.32
Mn	32.67	260.23	2.50	3.20	1.52	14.5	22.50	29.88	18.80	42.86	82.33
Mo	10.17	11.92	0.17	5.70	4.81	6.50	0.13	7.71	2.40	5.50	4.13
Zn	991.33	989.54	812.67	993.2	958.29	604.33	934.75	957.24	956.05	910.82	127.51
Ni	4.50	4.77	0.67	1.10	0.57	0.67	2.63	0.94	0.20	1.78	1.76
V	0.33	0.54	2.00	0.30	0.71	0.50	0.25	0.53	0.75	0.66	0.53
OTHER DETERMINATIONS											
T(°F)	73.77	74.28	73.12	74.51	73.99	74.4	73.93	73.24	73.70	73.88	0.48
VDP	112.67	124.92	154.04	95.93	98.85	121.83	111.57	130.28	161.14	123.47	22.44
Particulates	0.23	0.25	0.18	0.07	0.11	0.06	0.15	0.14	0.08	0.14	0.07

APPENDIX D
LUBRICANT ANALYSES DATA - MEANS AND STANDARD DEVIATIONS
(CONT'D)

Wear Metals & Additives	GREEN									
	78B4569	78B4766	79B2533	79B5659	79B5212	78B5038	79B5721	79B2271	79B1736	S _{xx}
Fe	266.5	659.54	38.14	70.0	178.89	179.53	114.75	798.67	95.30	272.95
Al	11.00	14.38	10.57	10.62	14.33	27.60	14.0	224.33	13.30	70.14
Cr	13.83	18.23	6.29	3.23	6.56	8.40	2.25	192.67	3.20	61.87
Cu	6.50	8.08	3.57	3.54	10.00	17.80	9.0	30.0	3.75	8.66
Mg	721.17	761.38	653.29	656.92	601.47	595.80	646.75	761.33	674.25	61.56
Na	42.50	36.83	25.00	35.38	47.22	31.73	30.75	291.67	34.80	85.63
Pb	998.00	998.0	70.29	49.00	89.76	71.67	48.0	998.0	53.65	467.32
Si	19.33	28.08	9.86	10.92	12.33	21.13	13.50	54.33	15.8	13.90
Sn	7.50	5.54	3.86	4.85	4.83	4.60	16.0	49.00	8.65	14.49
B	4.00	6.38	2.86	5.38	2.39	1.67	2.0	166.67	3.10	54.42
Ba	998.0	998.0	902.14	998.0	966.94	998.0	998.0	998.0	998.0	32.33
Ca	0.50	2.92	0.14	0.31	3.06	3.07	2.00	4.67	6.95	2.23
Mn	34.0	255.38	1.00	2.85	2.56	5.27	15.25	24.33	12.10	81.83
Mo	6.67	12.69	0.00	7.00	11.39	0.20	9.00	3.33	8.05	2.55
Zn	942.17	969.54	880.00	842.0	873.78	802.6	901.0	998.0	826.95	66.18
Ni	1.83	5.08	0.29	0.69	1.33	0.53	0.50	8.33	0.40	2.77
V	0.33	0.77	0.86	0.31	0.61	0.93	0.50	1.33	0.70	0.32

OTHER DETERMINATIONS

T(°F)	73.75	73.82	73.19	74.09	73.54	73.51	73.43	73.83	73.23	73.60	0.30
VDP	87.80	113.08	116.40	89.70	96.68	94.72	85.08	93.0	119.05	99.50	13.07
Particulates	0.13	0.18	0.11	0.15	0.15	0.18	0.11	0.22	0.14	0.15	0.04

APPENDIX E
STATISTICAL ANALYSIS

One of the primary goals of the Synlube test was to determine if the synthetic oils would perform better than the standard issue oil currently being used in the field. It was believed that one way of doing this was to determine, at a 99 percent confidence level, if there was any statistically significant difference between the means of average values for wear metals, additives, VDP and particulate content for each oil in the test. The Blue oils were evaluated collectively as one oil.

The first step in this analysis was to record the values for each variable as shown in the computer printouts from JOAP for each engine inspected. A mean ($\bar{x}$) was then computed for each variable for each engine. These means are shown in Appendix D, Volume II. Next a mean and standard deviation of the mean was determined for each variable. These computations resulted in one mean ($\bar{\bar{x}}$) and one standard deviation ($S\bar{\bar{x}}$) for each variable for each test oil, also shown in Appendix D, Volume II. Certainly numerical differences were expected and occurred, quite large difference in some cases. To test these data, a statistical one-tailed test was used to verify or deny the hypothesis that there were no significant differences between the means ($H_0=0$) (one oil performed as well as another). Two procedures, an "F-test" and a "confidence interval procedure," were used before establishing a "range of predicted difference for the means" at a 99 percent confidence level. The formula for predicting the range of difference between the means was:

$$\text{Range of difference between the means} =$$

$$(\bar{\bar{x}}_H - \bar{\bar{x}}_L) \pm \left[\frac{((n_H-1)S\bar{\bar{x}}_H^2 + (n_L-1)S\bar{\bar{x}}_L^2)}{(n_H + n_L - 2)} \left(\frac{1}{n_H} + \frac{1}{n_L} \right) \right]^{1/2} t$$

where:

- $\bar{\bar{x}}_H$ = mean for variable with the higher standard deviation ($S\bar{\bar{x}}_H$)
- $\bar{\bar{x}}_L$ = mean for variable with the lower standard deviation ($S\bar{\bar{x}}_L$)
- $S\bar{\bar{x}}_H^2$ = variance for variable with the higher standard deviation
- $S\bar{\bar{x}}_L^2$ = variance for variable with the lower standard deviation
- n_H = number of elements in the sample with the higher standard deviation

n_L = number of elements in the sample with the lower standard deviation

t = a value used in determining a level of certainty in establishing a statistical range and determined by a degree of freedom $(n_H + n_L - 2)$ or calculated as shown later.

The F-test was used to determine if any adjustments to a confidence interval were needed. A calculated F-value was determined by the formula:

$$F\text{-value} = \frac{Sx_H^2}{Sx_L^2}$$

The result was then compared to an F-value found in the F table for a 99 percent level of certainty for the degrees of freedom $(n_H - 1)$ for the numerator and $(n_L - 1)$ for the denominator. If the F-value from the table exceeded the calculated F-value, the F-test was considered "passed" (the null hypothesis was not rejected, nor were adjustments necessary for the confidence interval). If the F-value from the table did not exceed the calculated F-value, an adjustment was made for the confidence interval obtained from the "t" table (values determined for the degree of certainty wanted and a specified degree of freedom). The formula used for determining the corrected degree of freedom (d.f.) for entering the "t" table was:

Corrected d.f. =

$$\frac{1}{\left[\frac{K^2}{n_H - 1} + \frac{(1 - K)^2}{(n_L - 1)} \right]}$$

where $K = \frac{\frac{Sx_H^2}{n_H}}{\left(\frac{Sx_H^2}{n_H} + \frac{Sx_L^2}{n_L} \right)}$

If the value for the corrected d.f. fell between two integer values for degrees of freedom in the "t" table, an interpolated value was computed to establish the "t"-value for the corrected d.f.

DISTRIBUTION LIST

DEPARTMENT OF DEFENSE

DEFENSE DOCUMENTATION CTR
CAMERON STATION 12
ALEXANDRIA VA 22314

DEPARTMENT OF THE ARMY

CDR
U.S. ARMY BELVOIR RESEARCH AND
DEVELOPMENT CENTER
ATTN: STRBE-VF 10
STRBE-WC 2
FORT BELVOIR VA 22060

CDR
US ARMY TANK-AUTOMOTIVE CMD
ATTN: DRSTA-GBP (MR MCCARTNEY) 1
WARREN MI 48090

CDR
US ARMY ABERDEEN PROVING GROUND
ATTN: STEAP-MT-U (MR DEAVER) 1
ABERDEEN PROVING GROUND MD 21005

CDR
US ARMY YUMA PROVING GROUND
ATTN: STEYP-MLS-M (MR DOEBBLER) 1
YUMA AZ 85364

JOINT OIL ANALYSIS PROGRAM -
TECHNICAL SUPPORT CTR 1
BLDG 780
NAVAL AIR STATION
PENSACOLA FL 32508

DEPARTMENT OF THE AIR FORCE

HQ, USAF
ATTN: LEYSF (COL CUSTER) 1
WASHINGTON DC 20330

HQ AIR FORCE SYSTEMS CMD
ATTN: AFSC/DLF (MAJ VONADA) 1
ANDREWS AFB MD 20334

CDR
US AIR FORCE WRIGHT AERONAUTICAL
LAB
ATTN: AFWAL/MLSE (MR MORRIS) 2
WRIGHT-PATTERSON AFB OH 45433

CDR
SAN ANTONIO AIR LOGISTICS
CTR
ATTN: SAALC/MMPRR 1
KELLY AIR FORCE BASE TX 78241

CDR
WARNER ROBINS AIR LOGISTIC
CTR
ATTN WR-ALC/MMIRAB-1 (MR GRAHAM) 1
ROBINS AFB GA 31098

CDR
USAF 3902 TRANSPORTATION
SQUADRON
ATTN: LGTVP (MR VAUGHN) 1
OFFUTT AIR FORCE BASE NE 68113

OTHER GOVERNMENT AGENCIES

DIRECTOR
NATL MAINTENANCE TECH SUPPORT
CTR 2
US POSTAL SERVICE
NORMAN OK 73069