

## LAB NUMBER: **REPORT DATE: 11/9/2016 CODE:** 63/685

UNIT ID: **CLIENT ID: PAYMENT:** 

EQUIP. MAKE/MODEL: Mazda 1.8L 4-cyl FUEL TYPE: Gasoline (Unleaded) ADDITIONAL INFO: Turbo, Some track use	OIL TYPE & GRADE: OIL USE INTERVAL:	Red Line 10W/40 1,000 Miles					
PHONE:							

CLIENT COMMENTS

If those miles are correct, then this engine was rebuilt between the last sample and this one, and we can attribute some of the high metal levels to the wear-in process. But to be honest, that's a lot of lead and copper (bushing and bearing wear), even for a fresh engine. Silicon has been high all along for this unit, but much of that is additive in the Red Line o and we don't see it as a problem. Viscosity was good, fuel and coolant contamination were absent, and the TBN shower a strong additive package. Monitor oil pressure in case there's a bearing problem.

FAX:

ALT PHONE: EMAIL:

MI/HR on Oil    1,000    1,200    2,000    3,000    UNIVERSAL      MI/HR on Unit    3,000    4/28/2014    12/8/2012    AVERAGES    8/23/2014    12/8/2012    AVERAGES      Make Up Oil Added    0 qts									
MI/HR on Unit    3,000 Sample Date    UORT/O 10/7/2016    10,000 AVERAGES    9,000    7,000    UNIVERSAL AVERAGES      Make Up Oil Added    0 qts    0 qts<		MI/HR on Oil	1,000		1,200	2,000	3,000		
Sample Date    10/7/2016    AVERAGES    8/23/2014    4/28/2014    12/8/2012    AVERAGES      Make Up Oil Added    0 gts    0 gts <td></td> <td>MI/HR on Unit</td> <td>3,000</td> <td></td> <td>10,000</td> <td>9,000</td> <td>7,000</td> <td></td> <td>UNIVERSAL</td>		MI/HR on Unit	3,000		10,000	9,000	7,000		UNIVERSAL
Make Up Oil Added    0 qts    0 qts <th0 qts<="" th="">    0 qts    0 qts</th0>		Sample Date	10/7/2016	AVERAGES	8/23/2014	4/28/2014	12/8/2012		AVERAGES
ALUMINUM  2  3  2  3  4    CHROMIUM  1  1  1  1  0  1    IRON  22  25  24  35  20  11    IRON  22  25  24  35  20  11    IRON  22  25  24  35  20  11    COPPER  44  19  8  13  10	_	Make Up Oil Added	0 qts		0 qts	0 qts	0 qts		
ALUMINUM  2  3  2  3  4    CHROMIUM  1  1  1  1  0  0    IRON  22  25  24  35  20  1    IRON  44  19  8  13  10  0  0  0    MOLYBDENUM  606  697  736  749  698  99  9    NICKEL  1  1  2  1  1  2  1  1    MANGANESE  1  0  0  0  0  0  0    TITANIUM  3  1  0  0  0  0  0  0  0	ó								
CHROMIUM  1  1  1  1  1  1  0    IRON  22  25  24  35  20  11    COPPER  44  19  8  13  10  11    LEAD  45  20  9  15  12  12    TIN  4  1  0  0  0  0    MOLYBDENUM  606  697  736  749  698  99    NICKEL  1  1  2  1  1  0  0    MANGANESE  1  1  1  2  1  1  0  0    SILVER  1  0  0  0  0  0  0  0    OTASSIUM  7  6  6  7  4  1		ALUMINUM	2	3	2	3	4		3
IRON  22  25  24  35  20  11    COPPER  44  19  8  13  10  11    LEAD  45  20  9  15  12  12    TIN  4  1  0  0  0  0    MOLYBDENUM  606  697  736  749  698  99    NICKEL  1  1  2  1  1  90    MANGANESE  1  1  2  1  1  90    SILVER  1  0  0  0  0  90    SILVER  1  0  0  0  0  90    POTASSIUM  7  6  6  7  4  90    BORON  76  81  100  84  65  66    SILICON  29  26  24  26  26  11    MAGNESIUM  20  19  17  16  21  44    CALCIUM  2760  2634  2586  2602		CHROMIUM	1	1	1	1	0		1
COPPER    44    19    8    13    10      LEAD    45    20    9    15    12    1      TIN    4    1    0    0    0    0    1      MOLYBDENUM    606    697    736    749    698    9      NICKEL    1    1    2    1    1    1    1      MANGANESE    1    1    1    2    1    1    1    1      SILVER    1    0    0    0    0    0    1      POTASSIUM    7    6    6    7    4    1    1      BORON    76    81    100    84    65    6      SILICON    29    26    24    26    26    1      SODIUM    20    19    17    16    21    4      CALCIUM    2760    2634    2586    2602    2589    211	N	IRON	22	25	24	35	20		10
LEAD    45    20    9    15    12    12      TIN    4    1    0 <td< td=""><td>R</td><td>COPPER</td><td>44</td><td>19</td><td>8</td><td>13</td><td>10</td><td></td><td>4</td></td<>	R	COPPER	44	19	8	13	10		4
TIN    4    1    0    0    0    0      MOLYBDENUM    606    697    736    749    698    99      NICKEL    1    1    2    1    1    0    0    9      MANGANESE    1    1    2    1    1    0    0    0    0    0      SILVER    1    0	Ш	LEAD	45	20	9	15	12		3
MOLYBDENUM    606    697    736    749    698    99      NICKEL    1    1    2    1    1    0    0    0    0      MANGANESE    1    1    1    1    2    1    1    0    0      SILVER    1    0    0    0    0    0    0    0    0      TITANIUM    3    1    0    0    0    0    0    0    0      POTASSIUM    7    6    6    7    4    0	20	TIN	4	1	0	0	0		1
NICKEL    1    1    2    1 <td>E</td> <td>MOLYBDENUM</td> <td>606</td> <td>697</td> <td>736</td> <td>749</td> <td>698</td> <td></td> <td>90</td>	E	MOLYBDENUM	606	697	736	749	698		90
MANGANESE    1    1    1    2    1    1      SILVER    1    0	Ř	NICKEL	1	1	2	1	1		0
SILVER    1    0    0    0    0    0      TITANIUM    3    1    0    <	1	MANGANESE	1	1	1	2	1		1
TITANIUM  3  1  0  0  0    POTASSIUM  7  6  6  7  4  10    BORON  76  81  100  84  65  66    SILICON  29  26  24  26  26  11    SODIUM  20  19  17  16  21  44    CALCIUM  2760  2634  2586  2602  2589  211    MAGNESIUM  6  9  11  11  9  233    PHOSPHORUS  1138  1173  1152  1215  1187  80    ZINC  1355  1336  1187  1403  1397  93	Ζ	SILVER	1	0	0	0	0		0
POTASSIUM    7    6    6    7    4    7      BORON    76    81    100    84    65    60      SILICON    29    26    24    26    26    1      SODIUM    20    19    17    16    21    4      CALCIUM    2760    2634    2586    2602    2589    211      MAGNESIUM    6    9    11    11    9    233      PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93		TITANIUM	3	1	0	0	0		0
BORON    76    81    100    84    65    66      SILICON    29    26    24    26    26    1    1      SODIUM    20    19    17    16    21    44    45      CALCIUM    2760    2634    2586    2602    2589    211    44      MAGNESIUM    6    9    11    11    9    233    233      PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93	S	POTASSIUM	7	6	6	7	4		2
SILICON    29    26    24    26    26    1      SODIUM    20    19    17    16    21    42      CALCIUM    2760    2634    2586    2602    2589    211      MAGNESIUM    6    9    11    11    9    23      PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93	Ζ	BORON	76	81	100	84	65		62
SODIUM    20    19    17    16    21    44      CALCIUM    2760    2634    2586    2602    2589    211      MAGNESIUM    6    9    11    11    9    23      PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93	Ī	SILICON	29	26	24	26	26		11
CALCIUM    2760    2634    2586    2602    2589    211      MAGNESIUM    6    9    11    11    9    233      PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93	Π	SODIUM	20	19	17	16	21		42
MAGNESIUM    6    9    11    11    9    23      PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93		CALCIUM	2760	2634	2586	2602	2589		2116
PHOSPHORUS    1138    1173    1152    1215    1187    80      ZINC    1355    1336    1187    1403    1397    93		MAGNESIUM	6	9	11	11	9		239
ZINC 1355 1336 1187 1403 1397 93		PHOSPHORUS	1138	1173	1152	1215	1187		801
		ZINC	1355	1336	1187	1403	1397		935
		BARIUM	0	0	0	0	0		0

## Values Chould Do\*

			Should De				 
	SUS Viscosity @ 210°F	74.7	65-76	70.4	68.9	65.3	
	cSt Viscosity @ 100°C	14.18	11.6-14.8	13.05	12.67	11.70	
ŝ	Flashpoint in °F	440	>375	420	385	360	
Ξ	Fuel %	<0.5	<2.0	<0.5	<0.5	0.8	
Ř	Antifreeze %	0.0	0.0	0.0	0.0	0.0	
Б	Water %	0.0	<0.1	0.0	0.0	0.0	
02	Insolubles %	0.2	<0.6	0.2	0.3	0.3	
ď	TBN	5.9	>1.0				
	TAN						
	ISO Code						

\* THIS COLUMN APPLIES ONLY TO THE CURRENT SAMPLE

416 E. PETTIT AVE. FORT WAYNE, IN 46806 ©COPYRIGHT BLACKSTONE LABORATORIES INC. 2016

(260) 744-2380