

Area

## **OIL ANALYSIS REPORT**

GLYCOL

# 2015 JACOB W#2017 JACOB JACOB JACOB COLORI A/CO

Sample Date     Client Info     27 Jun 2024     18 Jun 2024     18 Oct 2023       Machine Age     mis     Client Info     116026     116026     116026       Oil Age     mis     Client Info     116026     116026     116026       Sample Status     Client Info     N/A     N/A     N/A     Changed       CONTAMINATION     method     Imit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     imit/base     current     history1     history2       Iron     ppm     ASTM DSIS5m     >50     & 89     & 811     15       Chromium     ppm     ASTM DSIS5m     >2     2     0     1       Nickel     ppm     ASTM DSIS5m     >3     0     0     0     1       Silver     ppm     ASTM DSIS5m     >30     18     4     2     <1       Quinnum     ppm     ASTM DSIS5m     >30     0     0<	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Date     Client Info     27 Jun 2024     18 Jun 2024     18 Oct 2023       Machine Age     mis     Client Info     116026     116026     116026       Oil Age     mis     Client Info     116026     116026     116026       Oil Changed     Client Info     N/A     N/A     N/A     Changed       Sample Status     Client Info     N/A     N/A     N/A     Changed       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     imit/base     current     history1     history1       Nickel     ppm     ASTM D5185m     >2     2     0     1       Nickel     ppm     ASTM D5185m     >2     2     0     0     1     -1     1     -1     1 <td>Sample Number</td> <td></td> <td>Client Info</td> <td></td> <th>GFL0123351</th> <td>GFL0123394</td> <td>GFL0082477</td>	Sample Number		Client Info		GFL0123351	GFL0123394	GFL0082477
Machine Age     mls     Client Info     116026     116026     116026     116026       Oil Age     mls     Client Info     N/A     N/A     Changed       Sample Status     Client Info     N/A     N/A     Changed       Sample Status     Client Info     N/A     N/A     Changed       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       Wetar     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185n     >550     A 89     A 81     15       Chromium     ppm     ASTM D5185n     >4     11     10     <1			Client Info		27 Jun 2024	18 Jun 2024	18 Oct 2023
Oil Age     mis     Client Info     116026     116026     116026     116026       Oil Changed     Client Info     N/A     N/A     Changed       Sample Status     Image     ABNORMAL     SEVERE     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >4     11     10     <1	Machine Age	mls			116026	116026	116026
Sample Status     Image     ABNORMAL     SEVERE     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185n     >50     A 89     A 81     15       Chromium     ppm     ASTM D5185n     >22     2     0     1       Nickel     ppm     ASTM D5185n     >3     0     0     0       Silver     ppm     ASTM D5185n     >3     0     0     0       Gopper     ppm     ASTM D5185n     >3     18     22     1       Cadmium     ppm     ASTM D5185n     >4     <1	-	mls	Client Info		116026	116026	116026
Sample Status     Image     ABNORMAL     SEVERE     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185n     >50     A 89     A 81     15       Chromium     ppm     ASTM D5185n     >22     2     0     1       Nickel     ppm     ASTM D5185n     >3     0     0     0       Silver     ppm     ASTM D5185n     >3     0     0     0       Gopper     ppm     ASTM D5185n     >3     18     22     1       Cadmium     ppm     ASTM D5185n     >4     <1	Oil Changed		Client Info		N/A	N/A	Changed
Water     WC Method     >0.1     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >4     89     81     15       Chromium     ppm     ASTM D5185m     >2     2     0     1       Nickel     ppm     ASTM D5185m     >2     2     0     0     0       Aluminum     ppm     ASTM D5185m     >3     0     0     0     0       Aluminum     ppm     ASTM D5185m     >30     18     22     <1	Sample Status				ABNORMAL	SEVERE	NORMAL
WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     ▲ 89     ▲ 81     15       Chromium     ppm     ASTM D5185m     >22     2     0     11     10     <1       Nickel     ppm     ASTM D5185m     >22     2     0     0     <1     <1       Silver     ppm     ASTM D5185m     >33     0     0     0     <1     <1       Silver     ppm     ASTM D5185m     >33     0     0     0     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <	CONTAMINAT	ION	method	limit/base	current	history1	history2
Iron     ppm     ASTM 05185m     >50     ▲ 89     ▲ 81     15       Chromium     ppm     ASTM 05185m     >4     ▲ 11     ▲ 10     <1	Water		WC Method	>0.1	NEG	NEG	NEG
Chromium     ppm     ASTM D5185m     >4     ▲ 11     ▲ 10     <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel     ppm     ASTM D5185m     >2     2     2     2     0       Titanium     ppm     ASTM D5185m     >3     0     0     0       Silver     ppm     ASTM D5185m     >3     0     0     0       Aluminum     ppm     ASTM D5185m     >9     9      7     3       Lead     ppm     ASTM D5185m     >30     18     22     <1	Iron	ppm	ASTM D5185m	>50	<u> </u>	<b>A</b> 81	15
Titanium     ppm     ASTM D5185m     0     <1     <1       Silver     ppm     ASTM D5185m     >3     0     0     0       Aluminum     ppm     ASTM D5185m     >30     18     22     <1	Chromium	ppm	ASTM D5185m	>4	<u> </u>	<b>1</b> 0	<1
Silver   ppm   ASTM D5185m   >3   0   0   0     Aluminum   ppm   ASTM D5185m   >9   9   4   7   3     Lead   ppm   ASTM D5185m   >30   18   4   22   <1     Copper   ppm   ASTM D5185m   >35   2   2   <1   0     Vanadium   ppm   ASTM D5185m   >4   <1   0   0   0     Cadmium   ppm   ASTM D5185m   >4   <10   0   0   0     ADDITIVES   method   limit/base   current   history1   history2     Boron   ppm   ASTM D5185m   0   0   0   0     Molybdenum   ppm   ASTM D5185m   62   63   52     Magnese   ppm   ASTM D5185m   569   641   562     Calcium   ppm   ASTM D5185m   800   818   914   764     Zinc   ppm   ASTM D5185m   800   818   914   764     Sulfur   ppm   ASTM D51	Nickel	ppm	ASTM D5185m	>2	2	2	0
Aluminum     ppm     ASTM D5185m     >9     9     4     7     3       Lead     ppm     ASTM D5185m     >30     18     22     <1	Titanium	ppm	ASTM D5185m		0	<1	<1
Lead     ppm     ASTM D5185m     >30     18     22     <1       Copper     ppm     ASTM D5185m     >35     2     2     <1	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper     ppm     ASTM D5185m     >35     2     2     <1       Tin     ppm     ASTM D5185m     >4     <1	Aluminum	ppm	ASTM D5185m	>9	9	<u> </u>	3
Tin     ppm     ASTM D5185m     >4     <1     0     0       Vanadium     ppm     ASTM D5185m     0     0     <1	Lead	ppm	ASTM D5185m	>30	18	<b>A</b> 22	<1
Vanadium     ppm     ASTM D5185m     0     <1     <1       Cadmium     ppm     ASTM D5185m     0     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     11     8     15       Barium     ppm     ASTM D5185m     0     0     0     0       Molybdenum     ppm     ASTM D5185m     622     63     52       Manganese     ppm     ASTM D5185m     662     641     562       Magnesium     ppm     ASTM D5185m     1694     1991     1665       Calcium     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     800     818     914     764       Sulfur     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     >20     634     470     4       Solitum	Copper	ppm	ASTM D5185m	>35	2	2	<1
Cadmium     ppm     ASTM D5185m     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     11     8     15       Barium     ppm     ASTM D5185m     11     8     15       Barium     ppm     ASTM D5185m     62     63     52       Manganese     ppm     ASTM D5185m     622     63     52       Manganesum     ppm     ASTM D5185m     62     641     562       Calcium     ppm     ASTM D5185m     1694     1991     1665       Phosphorus     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     800     818     914     764       Sulfur     ppm     ASTM D5185m     800     818     914     764       Solifon     ppm     ASTM D5185m     800     818     914     764       Sulfur     ppm     ASTM D518	Tin	ppm	ASTM D5185m	>4	<1	0	0
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m11815BariumppmASTM D5185m626352ManganeseppmASTM D5185m626352MagnesiumppmASTM D5185m569641562CalciumppmASTM D5185m569641562CalciumppmASTM D5185m169419911665PhosphorusppmASTM D5185m800818914764ZincppmASTM D5185m242533662423CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+10016147SodiumppmASTM D5185m>206344704Glycol%*ASTM D2982<	Vanadium	ppm	ASTM D5185m		0	<1	<1
Boron     ppm     ASTM D5185m     11     8     15       Barium     ppm     ASTM D5185m     0     0     0       Molybdenum     ppm     ASTM D5185m     62     63     52       Manganese     ppm     ASTM D5185m     1     2     <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium     ppm     ASTM D5185m     0     0     0       Molybdenum     ppm     ASTM D5185m     62     63     52       Manganese     ppm     ASTM D5185m     1     2     <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum     ppm     ASTM D5185m     62     63     52       Manganese     ppm     ASTM D5185m     1     2     <1	Boron	ppm	ASTM D5185m		11	8	15
Maganese     ppm     ASTM D5185m     1     2     <1       Magnesium     ppm     ASTM D5185m     569     641     562       Calcium     ppm     ASTM D5185m     1694     1991     1665       Phosphorus     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     2425     3366     2423       CONTAMINANTS     method     limit/base     current     history1     history2       Solicon     ppm     ASTM D5185m     >20     634     470     4       Glycol     %     *ASTM D2982      0.06     0.100        INFRA-RED     method     limit/base     current     history1     history2	Barium	ppm	ASTM D5185m		0	0	0
Magnesium     ppm     ASTM D5185m     569     641     562       Calcium     ppm     ASTM D5185m     1694     1991     1665       Phosphorus     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     2425     3366     2423       CONTAMINANTS     method     limit/base     current     history1     history2       Solium     ppm     ASTM D5185m     >4100     16     14     7       Sodium     ppm     ASTM D5185m     >20     634     470     4       Glycol     %     *ASTM D7844     0     0     0	Molybdenum	ppm	ASTM D5185m		62	63	52
Calcium     ppm     ASTM D5185m     1694     1991     1665       Phosphorus     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     2425     3366     2423       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     16     14     7       Sodium     ppm     ASTM D5185m     >20     634     470     4       Glycol     %     *ASTM D7845     0.006     0.100        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7624     >20     11.6     11.4	Manganese	ppm	ASTM D5185m		1	2	<1
Phosphorus     ppm     ASTM D5185m     800     818     914     764       Zinc     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     2425     3366     2423       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     16     14     7       Sodium     ppm     ASTM D5185m     >+20     634     470     4       Glycol     %     *ASTM D2982     0.06     0.10        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.mm     *ASTM D7624     >20     11.6     11.4     8.8       FLUID DEGRADATION     method     limit/base     current	Magnesium	ppm			569	641	562
Zinc     ppm     ASTM D5185m     880     1046     1191     997       Sulfur     ppm     ASTM D5185m     2425     3366     2423       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >+100     16     14     7       Sodium     ppm     ASTM D5185m     >+100     16     14     7       Sodium     ppm     ASTM D5185m     >+20     634     470     4       Glycol     %     *ASTM D2982     0.06     0.10        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0     0       Nitration     Abs/cm     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.tmm     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.tmm     *ASTM D7415     >30     24.8 <td>Calcium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>1694</th> <td>1991</td> <td>1665</td>	Calcium	ppm	ASTM D5185m		1694	1991	1665
SulfurppmASTM D5185m242533662423CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+10016147SodiumppmASTM D5185m>+10016147SodiumppmASTM D5185m>2046344704Glycol%*ASTM D2982<	Phosphorus	ppm				914	
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+10016147SodiumppmASTM D5185m>+10016147SodiumppmASTM D5185m>2046344704Glycol%*ASTM D298240.060.10INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000NitrationAbs/cm*ASTM D7624>2011.611.48.8SulfationAbs/lim*ASTM D7415>3024.824.918.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.imm*ASTM D7414>2519.119.416.0	Zinc	ppm		880		1191	997
Silicon   ppm   ASTM D5185m   >+100   16   14   7     Sodium   ppm   ASTM D5185m   >+100   16   14   7     Sodium   ppm   ASTM D5185m   >20   4   34   28   5     Potassium   ppm   ASTM D5185m   >20   4   634   470   4     Glycol   %   *ASTM D2982    A   0.06   0.10      INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7624   >20   11.6   11.4   8.8     Sulfation   Abs/.mm   *ASTM D7415   >30   24.8   24.9   18.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   19.1   19.4   16.0	Sulfur	ppm	ASTM D5185m		2425	3366	2423
Sodium     ppm     ASTM D5185m     34     28     5       Potassium     ppm     ASTM D5185m     >20     634     470     4       Glycol     %     *ASTM D2982     0.06     0.10        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0     0       Nitration     Abs/cm     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.imm     *ASTM D7415     >30     24.8     24.9     18.8       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.imm     *ASTM D7414     >25     19.1     19.4     16.0	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium     ppm     ASTM D5185m     >20     634     470     4       Glycol     %     *ASTM D2982     0.06     0.10        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0     0     0     0       Nitration     Abs/cm     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.1mm     *ASTM D7415     >30     24.8     24.9     18.8       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.1     19.4     16.0	Silicon	ppm	ASTM D5185m	>+100	16	14	7
Glycol%*ASTM D29820.060.10INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000NitrationAbs/cm*ASTM D7624>2011.611.48.8SulfationAbs/.1mm*ASTM D7415>3024.824.918.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.119.416.0	Sodium	ppm	ASTM D5185m		<u> </u>	<u> </u>	5
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000NitrationAbs/cm*ASTM D7624>2011.611.48.8SulfationAbs/.1mm*ASTM D7415>3024.824.918.8FLUID DEGRADATION methodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.119.416.0				>20			4
Soot %     %     *ASTM D7844     0     0     0       Nitration     Abs/cm     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.1mm     *ASTM D7415     >30     24.8     24.9     18.8       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.1     19.4     16.0	Glycol	%	*ASTM D2982		<b>A</b> 0.06	▲ 0.10	
Nitration     Abs/cm     *ASTM D7624     >20     11.6     11.4     8.8       Sulfation     Abs/.1mm     *ASTM D7415     >30     24.8     24.9     18.8       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.1     19.4     16.0	INFRA-RED		method	limit/base	current	history1	history2
Sulfation     Abs/.1mm     *ASTM D7415     >30     24.8     24.9     18.8       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.1     19.4     16.0	Soot %	%	*ASTM D7844		0	0	0
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.1     19.4     16.0	Nitration	Abs/cm	*ASTM D7624	>20	11.6	11.4	8.8
Oxidation Abs/.1mm *ASTM D7414 >25 19.1 19.4 16.0	Sulfation	Abs/.1mm	*ASTM D7415	>30	24.8	24.9	18.8
	FLUID DEGRA		method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	19.1	19.4	16.0
	Base Number (BN)	mg KOH/a	ASTM D2896		5.0	4.2	6.4

## (YA115787) 3493C Component Natural Gas Engine Fluid CHEVRON DELO 400 NG (30 GAL)

## DIAGNOSIS

#### Recommendation

We advise that you check for the source of the coolant leak. Check for low coolant level. We recommend that you drain the oil and perform a filter service on this component if not already done. We recommend an early resample to monitor this condition.

#### 🔺 Wear

Piston, ring and cylinder wear is indicated.

#### Contamination

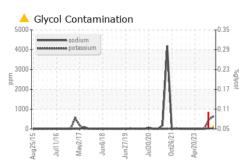
Sodium and/or potassium levels are high. Test for glycol is positive.

#### Fluid Condition

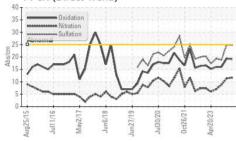
The BN result indicates that there is suitable alkalinity remaining in the oil. The oil is no longer serviceable due to the presence of contaminants.

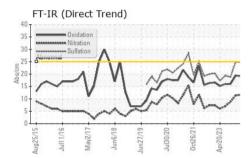


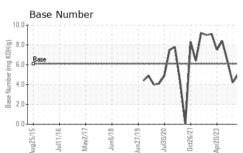
# **OIL ANALYSIS REPORT**

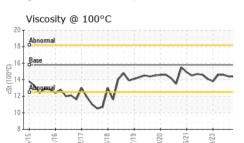


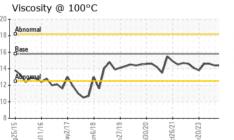


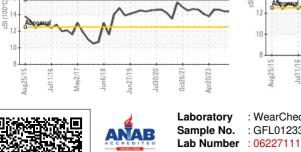


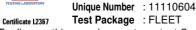














\* - Denotes test methods that are outside of the ISO 17025 scope of accreditation

: GFL0123351

Bolivia, NC US 28422 Contact: DONALD CRAVEN dcraven@gflenv.com T: -4179

7.	
ecision rule (JCGM 106:2012)	F: (910)253-

Statements of conformity to specifications are based on the simple acceptance de

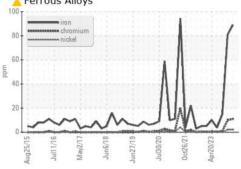
Report Id: GFL007 [WUSCAR] 06227111 (Generated: 07/09/2024 15:44:39) Rev: 1

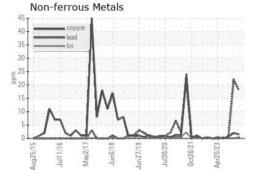
Submitted By: DONALD CRAVEN

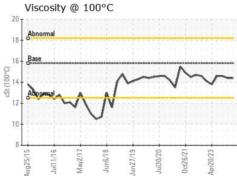
Page 2 of 2

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.8	14.4	14.4	14.6
GRAPHS						

Ferrous Alloys







: WearCheck USA - 501 Madison Ave., Cary, NC 27513

Received

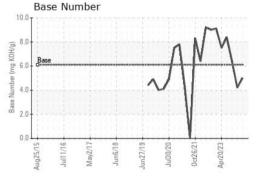
Diagnosed

Tested

: 03 Jul 2024

: 05 Jul 2024

: 06 Jul 2024 - Don Baldridge



2809 Galloway Road

GFL Environmental - 007 - Brunswick