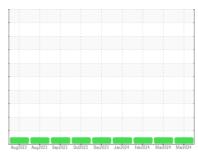


# **OIL ANALYSIS REPORT**

### **Sample Rating Trend**







# AUTOCAR 813022

Component

**Diesel Engine** 

**DIESEL ENGINE OIL SAE 40 (--- GAL)** 

### DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample.

#### Wear

All component wear rates are normal.

### Contamination

Elevated aluminum (Al) and/or lead (Pb) and potassium (K) levels in your metals analysis are likely a result of solder flux release into the lubricant and is common on new equipment/components. There is no indication of any contamination in the oil.

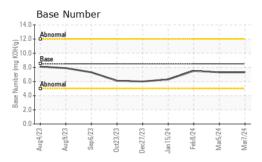
### **Fluid Condition**

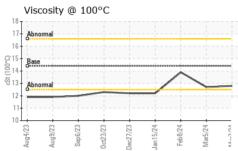
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORMATION   method   imit/base   current   history1   history2	Aug2023 Aug2023 Sep2023 Oct2023 Oct2023 Jan2024 Feb2024 Min2024 Min2024							
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2	
Machine Age         hrs         Client Info         1473         1451         1326           Oil Age         hrs         Client Info         1473         1451         1326           Oil Changed         Client Info         N/A         N/A         N/A         N/A           Sample Status         Ned         NEG         NCRMAL         NCRMAL         NCRMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0         <1.0         <1.0         <1.0           Water         WC Method         NEG         NEG         NEG         NEG         NEG           Iron         Pp         ASTM D5185m         >100         8         11         6           Chromium         ppm         ASTM D5185m         >20         0         <1         <1         6           Chromium         ppm         ASTM D5185m         >20         0         <1         <1         0         0         0         <1         <1         0         0         0         <1         <1         0         <1         <1         0         <1         <1         <1	Sample Number		Client Info		GFL0109021	GFL0109037	GFL0109076	
Oil Age         hrs         Client Info         1473         1451         1326           Oil Changed         Client Info         N/A         N/A         N/A         N/A         N/A           Sample Status         Client Info         N/A         N/A         N/A         N/A         N/A           CONTAMINATION         method         Imitibase         current         history2         nistory2           Fuel         WC Method         >5         <1.0	Sample Date		Client Info		07 Mar 2024	05 Mar 2024	08 Feb 2024	
Oil Changed Status         Client Info         N/A         N/A         N/A         N/A         N/A         NORMAL         NORMA	Machine Age	hrs	Client Info		1473	1451	1326	
Sample Status	Oil Age	hrs	Client Info		1473	1451	1326	
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0         <1.0         <1.0         <1.0           Water         WC Method         NEG         NEG         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         8         11         6           Chromium         ppm         ASTM D5185m         >20         0         <1         <1           Nickel         ppm         ASTM D5185m         >4         0         0         0           Silver         ppm         ASTM D5185m         >20         7         11         5           Lead         ppm         ASTM D5185m         >20         7         11         5           Lead         ppm         ASTM D5185m         >330         0         <1         <1         1           Copper         ppm         ASTM D5185m         >330         <	Oil Changed		Client Info		N/A	N/A	N/A	
Fuel	Sample Status				NORMAL	NORMAL	NORMAL	
Water Glycol         WC Method Glycol         NEG NEG         NEG NEG         NEG NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         8         11         6           Chromium         ppm         ASTM D5185m         >20         0         <1         <1           Nickel         ppm         ASTM D5185m         >4         0         0         0           Sliver         ppm         ASTM D5185m         >4         0         0         0           Sliver         ppm         ASTM D5185m         >40         0         0         0           Sliver         ppm         ASTM D5185m         >20         7         11         5           Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >15         0         <1         0           Vanadium         ppm         ASTM D5185m         >10         0         <1         0           Cadmium         ppm         ASTM D5185m         10         0         0 <td< th=""><th>CONTAMINAT</th><th>ION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	CONTAMINAT	ION	method	limit/base	current	history1	history2	
Silycol   WC Method   MEG   NEG   NEG	Fuel		WC Method	>5	<1.0	<1.0	<1.0	
Iron	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium         ppm         ASTM D5185m         >20         0         <1	WEAR METAL	S	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>100	8	11	6	
Titanium	Chromium	ppm	ASTM D5185m	>20	0	<1	<1	
Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >20         7         11         5           Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >330         0         <1	Nickel	ppm	ASTM D5185m	>4	0	0	0	
Aluminum         ppm         ASTM D5185m         >20         7         11         5           Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >330         0         <1         <1           Tin         ppm         ASTM D5185m         >15         0         <1         0           Vanadium         ppm         ASTM D5185m         0         <1         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         10         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         10         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         10         0         0         0	Titanium	ppm	ASTM D5185m		0	<1	0	
Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >330         0         <1	Silver	ppm	ASTM D5185m	>3	0	0	0	
Copper         ppm         ASTM D5185m         >330         0         <1	Aluminum	ppm	ASTM D5185m	>20	7	11	5	
Tin         ppm         ASTM D5185m         >15         0         <1	Lead	ppm	ASTM D5185m	>40	0	0	0	
Vanadium         ppm         ASTM D5185m         0         <1	Copper	ppm	ASTM D5185m	>330	0	<1	<1	
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         9         14         15           Barium         ppm         ASTM D5185m         10         0         0         8           Molybdenum         ppm         ASTM D5185m         100         58         84         59           Manganese         ppm         ASTM D5185m         100         0         0         0           Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25	Tin	ppm	ASTM D5185m	>15	0	<1	0	
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         9         14         15           Barium         ppm         ASTM D5185m         10         0         0         8           Molybdenum         ppm         ASTM D5185m         100         58         84         59           Manganese         ppm         ASTM D5185m         100         0         0         0           Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >	Vanadium	ppm	ASTM D5185m		0	<1	0	
Boron         ppm         ASTM D5185m         250         9         14         15           Barium         ppm         ASTM D5185m         10         0         0         8           Molybdenum         ppm         ASTM D5185m         100         58         84         59           Manganese         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >225         2         4         3           Sodium         ppm         ASTM D5185m	Cadmium	ppm	ASTM D5185m		0	0	0	
Barium         ppm         ASTM D5185m         10         0         0         8           Molybdenum         ppm         ASTM D5185m         100         58         84         59           Manganese         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         c	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum         ppm         ASTM D5185m         100         58         84         59           Manganese         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *ASTM D7844         >3         0.3	Boron	ppm	ASTM D5185m	250	9	14	15	
Manganese         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3 <th>Barium</th> <th>ppm</th> <th>ASTM D5185m</th> <th>10</th> <th>0</th> <th>0</th> <th>8</th>	Barium	ppm	ASTM D5185m	10	0	0	8	
Magnesium         ppm         ASTM D5185m         450         726         1171         706           Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30 </th <th>Molybdenum</th> <th>ppm</th> <th>ASTM D5185m</th> <th>100</th> <th></th> <th>84</th> <th>59</th>	Molybdenum	ppm	ASTM D5185m	100		84	59	
Calcium         ppm         ASTM D5185m         3000         1080         1726         1052           Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION         method<	Manganese	ppm	ASTM D5185m		0	0	0	
Phosphorus         ppm         ASTM D5185m         1150         817         1360         835           Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm	Magnesium	ppm	ASTM D5185m	450	726	1171	706	
Zinc         ppm         ASTM D5185m         1350         1009         1774         1054           Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *	Calcium	ppm	ASTM D5185m	3000	1080	1726	1052	
Sulfur         ppm         ASTM D5185m         4250         2519         4688         2764           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	Phosphorus	ppm	ASTM D5185m	1150	817			
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	Zinc	ppm	ASTM D5185m	1350	1009	1774	1054	
Silicon         ppm         ASTM D5185m         >25         2         4         3           Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9			ASTM D5185m	4250	2519	4688	2764	
Sodium         ppm         ASTM D5185m         >216         1         4         0           Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	CONTAMINAN	TS	method	limit/base	current	history1	history2	
Potassium         ppm         ASTM D5185m         >20         16         22         13           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9								
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9		ppm						
Soot %         %         *ASTM D7844         >3         0.3         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	Potassium	ppm	ASTM D5185m	>20	16	22	13	
Nitration         Abs/cm         *ASTM D7624         >20         7.8         7.3         6.5           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         18.1         17.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	Soot %		*ASTM D7844	>3	0.3		0.2	
FLUID DEGRADATION method limit/base current history1 history2       Oxidation     Abs/.1mm     *ASTM D7414 >25     14.2     13.8     12.9	Nitration	Abs/cm	*ASTM D7624	>20	7.8	7.3	6.5	
Oxidation         Abs/.1mm         *ASTM D7414         >25         14.2         13.8         12.9	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.3	18.1	17.5	
	FLUID DEGRAD	OATION	method	limit/base	current	history1	history2	
Base Number (BN)         mg KOH/g         ASTM D2896         8.5         7.3         7.5	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.2	13.8	12.9	
	Base Number (BN)	mg KOH/g	ASTM D2896	8.5	7.3	7.3	7.5	



## **OIL ANALYSIS REPORT**

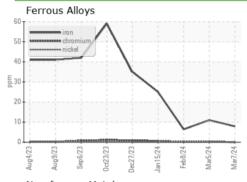


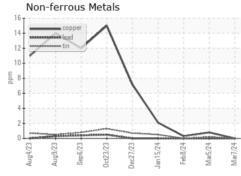


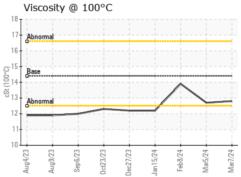
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

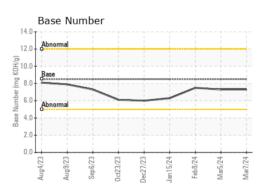
FLUID PROPI	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	14.4	12.8	12.7	13.9

### **GRAPHS**













Laboratory Sample No.

Lab Number : 06113834 Unique Number: 10922667 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0109021 Received : 11 Mar 2024 **Tested** : 11 Mar 2024

Diagnosed : 11 Mar 2024 - Wes Davis

GFL Environmental - 009 - Fairburn

6905 Roosevelt Hwy Fairburn, GA US 30213

Contact: Eric Jones erjones@gflenv.com T: (678)630-9927

To discuss this sample report, contact Customer Service at 1-800-237-1369. \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)