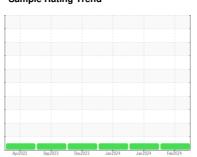


# **OIL ANALYSIS REPORT**

### **Sample Rating Trend**









## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the oil

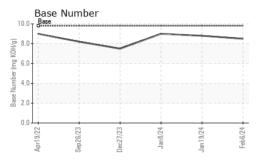
## **Fluid Condition**

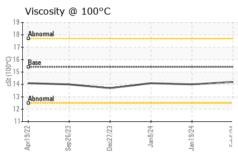
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Date	<u> </u>		Apr2022	Sep2023 Dec2023	Jan2024 Jan2024	Feb 2024	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		GFL0110159	GFL0109983	GFL0110011
Oil Age         hrs         Client Info         600         600         293969           Oil Changed Sample Status         Client Info         Changed Changed N/A         NORMAL         NO	Sample Date		Client Info		06 Feb 2024	19 Jan 2024	08 Jan 2024
Oil Changed Sample Status         Client Info         Changed NORMAL         NORMAL NORMAL         N/A NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0	•	hrs	Client Info		17374	17232	293969
Oil Changed Sample Status         Client Info         Changed NORMAL         NORMAL NORMAL         N/A NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >200         11         14         11           Chromium         ppm         ASTM D5185m         >20         <1         0         11           Nickel         ppm         ASTM D5185m         >2         0         <1         0         0           Aluminum         ppm         ASTM D5185m         >2         0         <1         0         0           Aluminum         ppm         ASTM D5185m         >30         0         0         0         0         0           Copper         ppm         ASTM D5185m         >30 <th>Oil Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>600</th> <th>600</th> <th>293969</th>	Oil Age	hrs	Client Info		600	600	293969
NORMAL   NORMAL   NORMAL   CONTAMINATION   method   limit/base   current   history1   history2	Oil Changed		Client Info		Changed	Changed	N/A
Fuel	-						NORMAL
Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         Imitibase         Current         history1         history2           WEAR METALS         method         limitibase         current         history1         history2           Iron         ppm         ASTM D5185m         >20         <1         2         <1           Chromium         ppm         ASTM D5185m         >20         <1         0         <1           Nickel         ppm         ASTM D5185m         >2         0         <1         0            Silver         ppm         ASTM D5185m         >2         0         <1         0            Silver         ppm         ASTM D5185m         >30         0         0         0            Silver         ppm         ASTM D5185m         >30         0         0         0         0           Silver         ppm         ASTM D5185m         >30         0         0         0         0         0           Copper         ppm         ASTM D5185m         >30         0         0         0         0         0         0         <	CONTAMINATI	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1	WEAR METALS	S	method	limit/base	current	history1	history2
Chromium         ppm         ASTM D5185m         >20         <1         2         <1           Nickel         ppm         ASTM D5185m         >2         0         <1	Iron	ppm	ASTM D5185m	>200	11	14	11
Nickel	Chromium	• •	ASTM D5185m	>20	<1	2	<1
Titanium         ppm         ASTM D5185m         >2         0         <1         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >30         6         9         10           Lead         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm         ASTM D5185m         >30         4         2         3           Tin         ppm         ASTM D5185m         >15         <1         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         0         0	Nickel						0
Silver	Titanium			>2	0		0
Aluminum         ppm         ASTM D5185m         >30         6         9         10           Lead         ppm         ASTM D5185m         >30         0         0         0           Copper         ppm         ASTM D5185m         >30         4         2         3           Tin         ppm         ASTM D5185m         >15         <1					-		
Lead	Aluminum	• •	ASTM D5185m	>30	6	9	10
Copper         ppm         ASTM D5185m         >30         4         2         3           Tin         ppm         ASTM D5185m         >15         <1					0		
Tin							
Vanadium         ppm         ASTM D5185m         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         3         2         <1           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         59         58         54           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         919         911         928           Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1	• •				-		
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         3         2         <1		• •		7.0			
Boron							
Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         59         58         54           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         919         911         928           Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base<	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         59         58         54           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         919         911         928           Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >20         5         10         1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         <	Boron	ppm	ASTM D5185m	0	3	2	<1
Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         919         911         928           Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >20         5         10         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844 <t< td=""><th>Barium</th><td>ppm</td><td>ASTM D5185m</td><td>0</td><th>0</th><td>0</td><td>0</td></t<>	Barium	ppm	ASTM D5185m	0	0	0	0
Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         919         911         928           Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >20         5         10         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624 <t< td=""><th>Molybdenum</th><td>ppm</td><td>ASTM D5185m</td><td>60</td><th>59</th><td>58</td><td>54</td></t<>	Molybdenum	ppm	ASTM D5185m	60	59	58	54
Magnesium         ppm         ASTM D5185m         1010         919         911         928           Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >20         5         10         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         "ASTM D7414         >3	•	• •	ASTM D5185m	0	<1	<1	0
Calcium         ppm         ASTM D5185m         1070         1015         985         1005           Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >30         5         8         10           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         *ASTM	-				919	911	928
Phosphorus         ppm         ASTM D5185m         1150         1065         953         952           Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >20         5         10         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         *ASTM D7414 <t< td=""><th></th><td></td><td>ASTM D5185m</td><td>1070</td><th>1015</th><td>985</td><td>1005</td></t<>			ASTM D5185m	1070	1015	985	1005
Zinc         ppm         ASTM D5185m         1270         1239         1187         1266           Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         >30         5         17         0         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation	Phosphorus				1065		
Sulfur         ppm         ASTM D5185m         2060         2955         3125         2964           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         17         0         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3			ASTM D5185m	1270	1239		
Silicon         ppm         ASTM D5185m         >30         5         8         10           Sodium         ppm         ASTM D5185m         17         0         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3							
Sodium         ppm         ASTM D5185m         17         0         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	CONTAMINAN	TS	method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185m         17         0         1           Potassium         ppm         ASTM D5185m         >20         5         10         11           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	Silicon	ppm	ASTM D5185m	>30	5	8	10
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	Sodium	ppm	ASTM D5185m		17	0	1
Soot %         %         *ASTM D7844         >3         0.3         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	Potassium	ppm	ASTM D5185m	>20	5	10	11
Nitration         Abs/cm         *ASTM D7624         >20         6.3         5.3         5.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	Soot %	%	*ASTM D7844	>3	0.3	0.2	0.2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.4         18.1         18.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	Nitration	Abs/cm	*ASTM D7624	>20	6.3	5.3	5.3
Oxidation         Abs/.1mm         *ASTM D7414         >25         14.4         13.2         13.3	Sulfation						
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g   ASTM D2896   9.8   8.5   8.8   9.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.4	13.2	13.3
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.5	8.8	9.0



# **OIL ANALYSIS REPORT**

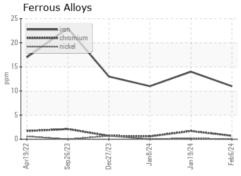


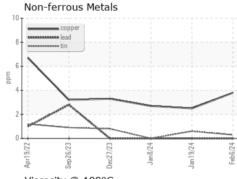


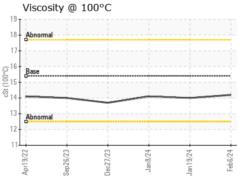
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

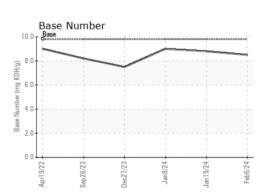
FLUID PROPI	EKITES	method	ilmit/base		nistory i	nistory∠
Visc @ 100°C	cSt	ASTM D445	15.4	14.2	14.0	14.1

## **GRAPHS**













Laboratory Sample No.

: GFL0110159 Lab Number : 06085846 Unique Number : 10873291 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 12 Feb 2024 **Tested** 

Diagnosed

: 13 Feb 2024 : 13 Feb 2024 - Wes Davis

GFL Environmental - 410 - Michigan West

39000 Van Born Rd Wayne, MI US 48184

Contact: Belal Dgheish bdgheish@gflenv.com T: (734)714-2340

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)

Report Id: GFL410 [WUSCAR] 06085846 (Generated: 02/13/2024 09:33:29) Rev: 1

Submitted By: seel also GFL468 - Laura Wilson