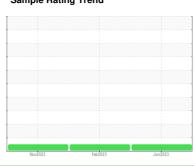


# **OIL ANALYSIS REPORT**

Sample Rating Trend







Machine Id 513019
Component

**Diesel Engine** 

NOT GIVEN (--- GAL)

## 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.

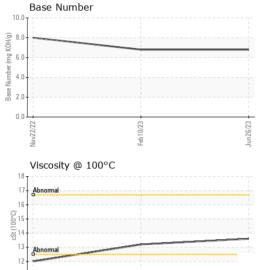
## **Fluid Condition**

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

SAMPLE INFORMATION   method   fimil/base   current   history 1   history 2			No	v2022	Feb2023 Jun20	23	
Sample Date   Client Info   1843   1062   420	SAMPLE INFORT	MATION	method	limit/base	current	history 1	history 2
Machine Age         hrs         Client Info         781         600         420           Oil Age         hrs         Client Info         781         600         420           Oil Changed         Client Info         Changed         Changed         Changed           Sample Status         Image: Control of Changed         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history 1         history 2           Fuel         WC Method         55         <1.0         <1.0         0.6           Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history 1         history 2           Iron         ppm         ASTM D5185m         >100         29         33         39           Chromitium         ppm         ASTM D5185m         >20         2         2         1           Nickel         ppm         ASTM D5185m         >3         <1         0         <1           Silver         ppm         ASTM D5185m         >33         <1         0         <1           Lead         ppm         ASTM D	Sample Number		Client Info		GFL0073479	GFL0064734	GFL0060818
Oil Age         hrs         Client Info         781         600         420           Oil Changed Sample Status         Client Info         Changed NORMAL         Changed NORMAL         Changed NORMAL	Sample Date		Client Info		26 Jun 2023	10 Feb 2023	22 Nov 2022
Oil Changed Sample Status         Client Info         Changed NORMAL         Change And NoRMAL         Change And NoRMAL         Change And NoRMAL         Change And NoRMAL	Machine Age	hrs			1843	1062	
Sample Status	-	hrs			781	600	420
CONTAMINATION         method         limit/base         current         history 1         history 2           Fuel         WC Method         >5         <1.0         <1.0         0.6           Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history 1         history 2           Iron         ppm         ASTM D5185m         >100         29         33         39           Chromium         ppm         ASTM D5185m         >20         2         2         1           Nickel         ppm         ASTM D5185m         >4         1         <1         0           Silver         ppm         ASTM D5185m         >3         <1         0         <1           Silver         ppm         ASTM D5185m         >30         1         2         <1           Silver         ppm         ASTM D5185m         >40         1         2         <1           Copper         ppm         ASTM D5185m         >30         3         6         26           Tin         ppm         ASTM D5185m         >41         >1         2         0	-		Client Info			Ü	Ü
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history 1	history 2
WEAR METALS         method         limit/base         current         history 1         history 2           Iron         ppm         ASTM D5185m         >100         29         33         39           Chromium         ppm         ASTM D5185m         >20         2         2         1           Nickel         ppm         ASTM D5185m         >4         1         <1         0           Titanium         ppm         ASTM D5185m         >3         <1         0         <1           Aluminum         ppm         ASTM D5185m         >20         18         14         10           Lead         ppm         ASTM D5185m         >15         1         2         <1           Copper         ppm         ASTM D5185m         >15         1         7 <th></th> <th></th> <th></th> <th>&gt;5</th> <th></th> <th></th> <th></th>				>5			
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         2         2         1           Nickel         ppm         ASTM D5185m         >4         1         <1         0           Titanium         ppm         ASTM D5185m         >3         <1         0         <1           Silver         ppm         ASTM D5185m         >3         <1         0         <1           Aluminum         ppm         ASTM D5185m         >3         <1         0         <1           Lead         ppm         ASTM D5185m         >40         1         2         <1           Copper         ppm         ASTM D5185m         >330         3         6         26           Tin         ppm         ASTM D5185m         >15         1         2         0           Vanadium         ppm         ASTM D5185m         >15         1         2         0           Vanadium         ppm         ASTM D5185m         <15         1         7         0         0           Cadmium         ppm         ASTM D5185m         <15         1         7         3         61           Barium         ppm         ASTM D5185m         <0	WEAR METAL	S	method	limit/base	current	history 1	history 2
Nickel	Iron	ppm	ASTM D5185m	>100	29	33	39
Titanium         ppm         ASTM D5185m         14         12         0           Silver         ppm         ASTM D5185m         >3         <1         0         <1           Aluminum         ppm         ASTM D5185m         >20         18         14         10           Lead         ppm         ASTM D5185m         >40         1         2         <1           Copper         ppm         ASTM D5185m         >330         3         6         26           Tin         ppm         ASTM D5185m         >15         1         2         0           Vanadium         ppm         ASTM D5185m         >15         1         2         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history 1         history 2           Baron         ppm         ASTM D5185m         0         0         0         3           ADDITIVES         method         limit/base         current         history 1         history 2           Baron         ppm         ASTM D5185m         0         0         3         1 <th>Chromium</th> <th>ppm</th> <th>ASTM D5185m</th> <th>&gt;20</th> <th>2</th> <th>2</th> <th>1</th>	Chromium	ppm	ASTM D5185m	>20	2	2	1
Silver	Nickel	ppm	ASTM D5185m	>4	1	<1	0
Aluminum         ppm         ASTM D5185m         >20         18         14         10           Lead         ppm         ASTM D5185m         >40         1         2         <1           Copper         ppm         ASTM D5185m         >330         3         6         26           Tin         ppm         ASTM D5185m         >15         1         2         0           Vanadium         ppm         ASTM D5185m         <1         <1         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history 1         history 2           Boron         ppm         ASTM D5185m         51         73         61           Barium         ppm         ASTM D5185m         37         45         10           Manganesium         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         769         654         645           Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm	Titanium	ppm	ASTM D5185m		14	12	0
Lead         ppm         ASTM D5185m         >40         1         2         <1		ppm	ASTM D5185m			0	<1
Copper         ppm         ASTM D5185m         >330         3         6         26           Tin         ppm         ASTM D5185m         >15         1         2         0           Vanadium         ppm         ASTM D5185m         <1         <1         0           Cadmium         ppm         ASTM D5185m         0         0         0           Boron         ppm         ASTM D5185m         51         73         61           Barium         ppm         ASTM D5185m         0         0         3           Molybdenum         ppm         ASTM D5185m         37         45         10           Manganese         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         1714         1484         1360           Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11 <th>Aluminum</th> <th>ppm</th> <th>ASTM D5185m</th> <th>&gt;20</th> <th>18</th> <th>14</th> <th>10</th>	Aluminum	ppm	ASTM D5185m	>20	18	14	10
Tin         ppm         ASTM D5185m         >15         1         2         0           Vanadium         ppm         ASTM D5185m         <1	Lead	ppm			1	2	<1
Vanadium         ppm         ASTM D5185m         <1	Copper	ppm	ASTM D5185m	>330	3		26
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history 1         history 2           Boron         ppm         ASTM D5185m         51         73         61           Barium         ppm         ASTM D5185m         0         0         0         3           Molybdenum         ppm         ASTM D5185m         37         45         10           Manganese         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         728         689         696           Calcium         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         225         11         15         41           Sodium         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         >20         37<				>15			_
ADDITIVES							
Boron   ppm   ASTM D5185m   D0   O   O   O   O	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         0         0         3           Molybdenum         ppm         ASTM D5185m         37         45         10           Manganese         ppm         ASTM D5185m         1         1         4           Magnesium         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         1714         1484         1360           Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         5         4         3           INFRA-RED         method         limit/base         current         <	ADDITIVES		method	limit/base	current	history 1	history 2
Molybdenum         ppm         ASTM D5185m         37         45         10           Manganese         ppm         ASTM D5185m         1         1         4           Magnesium         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/.1mm	Boron	ppm	ASTM D5185m		51	73	61
Manganese         ppm         ASTM D5185m         1         1         4           Magnesium         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         1714         1484         1360           Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         >25         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/	Barium	ppm	ASTM D5185m		0	0	3
Magnesium         ppm         ASTM D5185m         769         654         645           Calcium         ppm         ASTM D5185m         1714         1484         1360           Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         >25         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8 <td< th=""><th>Molybdenum</th><th>ppm</th><th></th><th></th><th>37</th><th>45</th><th>10</th></td<>	Molybdenum	ppm			37	45	10
Calcium         ppm         ASTM D5185m         1714         1484         1360           Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cmm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION         method         limit/base         current         history 1         history	•	ppm	ASTM D5185m		-		
Phosphorus         ppm         ASTM D5185m         728         689         696           Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION         method         limit/base         current         history	Magnesium	ppm	ASTM D5185m		769		
Zinc         ppm         ASTM D5185m         875         836         783           Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION         method         limit/base         current         history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25		ppm					
Sulfur         ppm         ASTM D5185m         3875         2846         3219           CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current         history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5	·				-		
CONTAMINANTS         method         limit/base         current         history 1         history 2           Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5	-						
Silicon         ppm         ASTM D5185m         >25         11         15         41           Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5					3875		
Sodium         ppm         ASTM D5185m         5         4         3           Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION         method         limit/base         current         history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5							
Potassium         ppm         ASTM D5185m         >20         37         39         33           INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5				>25			
INFRA-RED         method         limit/base         current         history 1         history 2           Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current         history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5				00			
Soot %         %         *ASTM D7844         >3         0.8         0.5         0.3           Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current         history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5		ppm					
Nitration         Abs/cm         *ASTM D7624         >20         10.5         10.2         9.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current         limit/base         current         history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5							
Sulfation         Abs/.1mm         *ASTM D7415         >30         23.0         21.7         21.1           FLUID DEGRADATION method limit/base current history 1         history 2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5							
FLUID DEGRADATION method limit/base current history 1 history 2  Oxidation Abs/.1mm *ASTM D7414 >25 18.2 16.7 16.5							
Oxidation         Abs/.1mm         *ASTM D7414         >25         18.2         16.7         16.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	23.0	21.7	21.1
	FLUID DEGRA	OATION	method	limit/base	current	history 1	history 2
Base Number (BN)         mg KOH/g         ASTM D2896         6.8         8.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	18.2	16.7	16.5
	Base Number (BN)	mg KOH/g	ASTM D2896		6.8	6.8	8.0



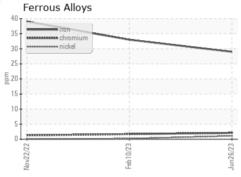
## **OIL ANALYSIS REPORT**

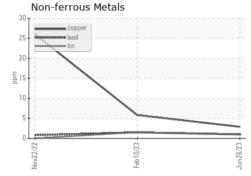


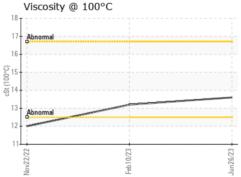
VISUAL		method	limit/base	current	history 1	history 2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

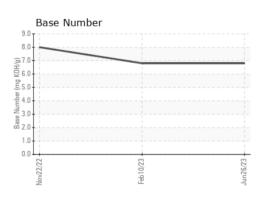
FLUID PROP	EKITES	method	ilmivbase		nistory i	nistory 2
Visc @ 100°C	cSt	ASTM D445		13.6	13.2	12.0

## **GRAPHS**













Certificate L2367

Laboratory Sample No.

Lab Number Unique Number : 10536933 Test Package : FLEET

: GFL0073479 : 05886450

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 29 Jun 2023

Diagnosed : 03 Jul 2023 Diagnostician : Don Baldridge GFL Environmental - 629 - Northern A1

3947 US 131 N Kalkaska, MI US 49646-8428

Contact: MITCH HERSHBERGER

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)

T: (231)624-0848 F: