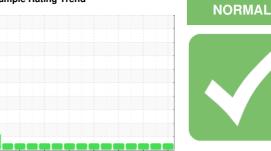


# **OIL ANALYSIS REPORT**

### Sample Rating Trend





729044-361494

Component

Diesel Engine

CASTROL CRB Multi 15W-40 CK-4 (--- 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

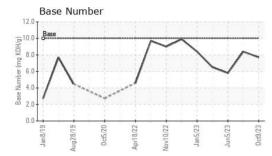
### **Fluid Condition**

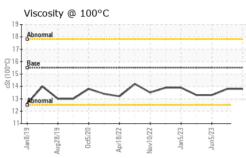
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Number	5W-40 CK-4 (	GAL)	Jan 2019 Au	2019 Oct2020 Apr202	2 Nov2022 Jan2023 Jun20	23 Oct2023	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age   hrs   Client Info   150   150   600	Sample Number		Client Info		GFL0090274	GFL0090234	GFL0076795
Oil Age         hrs         Client Info         150         150         600           Oil Changed Sample Status         Client Info         Not Changd Not Changd Not Changed NorMAL         Not Changd NoRMAL         1.0         1.0         1.0         1.0         1.0	Sample Date		Client Info		09 Oct 2023	30 Aug 2023	05 Jun 2023
Oil Changed   Client Info   Not Changed   NORMAL   NORM	Machine Age	hrs	Client Info		4957	4690	4082
NORMAL   NORMAL   NORMAL   NORMAL   CONTAMINATION   method   limit/base   current   history1   history2   history2     ATM D5185m   ASTM D51	Oil Age	hrs	Client Info		150	150	600
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0	Oil Changed		Client Info		Not Changd	Not Changd	Changed
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Irron	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	.S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	8	5	13
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>5	0	1	0
Silver	Titanium		ASTM D5185m	>2	<1	0	0
Aluminum	Silver					0	0
Lead	Aluminum			>20			
Copper         ppm         ASTM D5185m         >330         1         <1         1           Tin         ppm         ASTM D5185m         >15         <1							0
Tin	Copper			>330			
Vanadium         ppm         ASTM D5185m         <1         <1         0           Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         <1         6         <1           Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         56         58         58           Manganese         ppm         ASTM D5185m         929         997         1013           Calcium         ppm         ASTM D5185m         993         1098         1095           Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2	• •						
Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         <1				7.0			
Boron   ppm   ASTM D5185m   variety   Variety   ASTM D5185m   variety							
Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         56         58         58           Manganese         ppm         ASTM D5185m         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         56         58         58           Manganese         ppm         ASTM D5185m         <1         <1         <1         <1           Magnesium         ppm         ASTM D5185m         929         997         1013           Calcium         ppm         ASTM D5185m         993         1098         1095           Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm	Boron	ppm	ASTM D5185m		<1	6	<1
Manganese         ppm         ASTM D5185m         <1         <1         <1           Magnesium         ppm         ASTM D5185m         929         997         1013           Calcium         ppm         ASTM D5185m         993         1098         1095           Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         1195         1344         1428           Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfa	Barium	ppm	ASTM D5185m		0	0	0
Magnesium         ppm         ASTM D5185m         929         997         1013           Calcium         ppm         ASTM D5185m         993         1098         1095           Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         1195         1344         1428           Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1 <t< td=""><td>Molybdenum</td><td>ppm</td><td>ASTM D5185m</td><td></td><th>56</th><td>58</td><td>58</td></t<>	Molybdenum	ppm	ASTM D5185m		56	58	58
Calcium         ppm         ASTM D5185m         993         1098         1095           Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         1195         1344         1428           Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current         history1         history	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         1195         1344         1428           Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25	-	ppm	ASTM D5185m		929	997	1013
Phosphorus         ppm         ASTM D5185m         967         1097         1026           Zinc         ppm         ASTM D5185m         1195         1344         1428           Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         >20         2         1         2           Potassium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current	Calcium	ppm	ASTM D5185m		993	1098	1095
Zinc         ppm         ASTM D5185m         1195         1344         1428           Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         4         8         7           Potassium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.	Phosphorus	ppm	ASTM D5185m		967	1097	1026
Sulfur         ppm         ASTM D5185m         2847         3368         3878           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         4         8         7           Potassium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1			ASTM D5185m		1195	1344	1428
Silicon         ppm         ASTM D5185m         >25         4         6         6           Sodium         ppm         ASTM D5185m         4         8         7           Potassium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	Sulfur		ASTM D5185m			3368	3878
Sodium         ppm         ASTM D5185m         4         8         7           Potassium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         2         1         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	Silicon	ppm	ASTM D5185m	>25	4	6	6
INFRA-RED	Sodium	ppm	ASTM D5185m		4	8	7
Soot %         *ASTM D7844         >4         0.3         0.2         0.4           Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	Potassium	ppm	ASTM D5185m	>20	2	1	2
Nitration         Abs/cm         *ASTM D7624         >20         6.2         5.4         8.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	Soot %	%	*ASTM D7844	>4	0.3	0.2	0.4
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.2         17.9         21.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         13.7         18.1	Nitration	Abs/cm	*ASTM D7624	>20	6.2	5.4	8.7
Oxidation Abs/.1mm *ASTM D7414 >25 <b>13.7</b> 13.7 18.1	Sulfation						
	FLUID DEGRAI	AOITAC	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.7	13.7	18.1
	Base Number (BN)	mg KOH/g			7.7	8.4	5.8



## **OIL ANALYSIS REPORT**

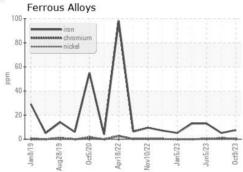


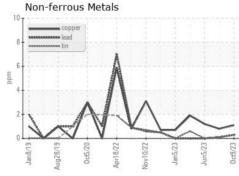


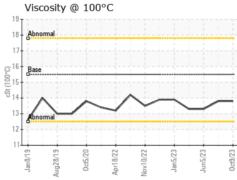
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

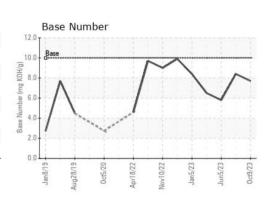
FLUID PROPI	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	15.5	13.8	13.8	13.3

### **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number

: 05977572 Unique Number : 10689522 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0090274 Received : 12 Oct 2023

Diagnosed : 13 Oct 2023 Diagnostician : Wes Davis

GFL Environmental - 821 - Ozarks Hauling

33924 Olath Drive Lebanon, MO US 65536

Contact: Landen Johnson landen.johnson@gflenv.com T: (417)664-0010

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)