

OIL ANALYSIS REPORT

(JN2K80) **STERLING 10098**

Diesel Engine

DIESEL ENGINE OIL SAE 40 (32 GAL)

Sample Rating Trend



DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

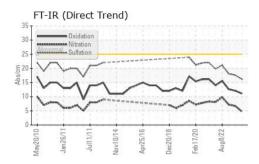
Fluid Condition

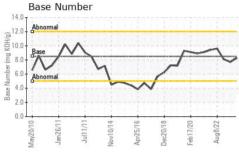
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

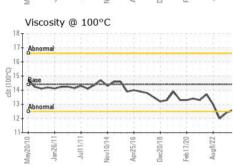
Sample Date Client Info 24 May 2024 29 Feb 2024 15 Jun 2023 Machine Age hrs Client Info 13319 13296 80674 Oil Age hrs Client Info 0 0 12932 Oil Changed Client Info Not Changd N/A N/A Sample Status NorMAL NORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 ▲ 3.4 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 >10 15 26 Chromium ppm ASTM D5185m >20 <1 <1 4 Nickel ppm ASTM D5185m >2 <1 <1 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>								
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2	
Machine Age hrs Client Info 13319 13296 80674 Oil Age hrs Client Info 0 0 12932 Oil Changed Client Info Not Changd N/A N/A Sample Status Not Changd N/A N/A Fuel WC Method 25 <1.0 <1.0 3.4 Water WC Method >5 <1.0 NEG NEG Glycol WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185m >10 10 15 26 Chromium ppm ASTM 05185m >20 <1 <1 4 Nickel ppm ASTM 05185m >20 <1 <1 <1 Silver ppm ASTM 05185m >2 <1 <1 <1 <1 Silver ppm ASTM 05185m >40 <th>Sample Number</th> <th></th> <th>Client Info</th> <th></th> <th>GFL0116761</th> <th>GFL0109047</th> <th>GFL0086246</th>	Sample Number		Client Info		GFL0116761	GFL0109047	GFL0086246	
Oil Changed Oil Changed Client Info Not Changed N/A N/A N/A Sample Status Northand Normal N/A N/A N/A Sample Status WC Method Sociation Current history1 history2 Fuel WC Method Sociation Sociation Assistance NEG	Sample Date		Client Info		24 May 2024	29 Feb 2024	15 Jun 2023	
Cilient Info	Machine Age	hrs	Client Info		13319	13296	80674	
Sample Status	Oil Age	hrs	Client Info		0	0	12932	
Fuel	Oil Changed		Client Info		Not Changd	N/A	N/A	
Fuel WC Method S5 C1.0 C1.0 A3.4	Sample Status				NORMAL	NORMAL	ABNORMAL	
Water Glycol WC Method WC Method >0.2 NEG NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 10 15 26 Chromium ppm ASTM D5185m >20 <1 <1 4 Nickel ppm ASTM D5185m >50 <1 0 <1 Silver ppm ASTM D5185m >22 <1 <1 <1 Silver ppm ASTM D5185m >2 <1 <1 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Aluminum ppm ASTM D5185m >40 1 0 <1 Copper ppm ASTM D5185m >15	CONTAMINAT	ION	method	limit/base	current	history1	history2	
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	△ 3.4	
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium ppm ASTM D5185m >20 <1	WEAR METAL	S	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>100	10	15	26	
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	<1	4	
Silver	Nickel	ppm	ASTM D5185m	>50	<1	0	<1	
Aluminum ppm ASTM D5185m >50 3 6 18 Lead ppm ASTM D5185m >40 1 0 1 Copper ppm ASTM D5185m >330 1 <1	Titanium	ppm	ASTM D5185m	>2	<1	<1	<1	
Lead ppm ASTM D5185m >40 1 0 1 Copper ppm ASTM D5185m >330 1 <1 2 Tin ppm ASTM D5185m >15 <1 0 <1 Vanadium ppm ASTM D5185m <1 <1 0 <1 Cadmium ppm ASTM D5185m <1 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 23 11 10 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 10 0 0 4 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 23 11 10 ADDITIVES method ppm ASTM D5185m 250 27	Silver	ppm	ASTM D5185m	>2	1	0	<1	
Copper ppm ASTM D5185m >330 1 <1 2 Tin ppm ASTM D5185m >15 <1	Aluminum	ppm	ASTM D5185m	>50	3	6	18	
Tin ppm ASTM D5185m >15 <1 0 <1 Vanadium ppm ASTM D5185m <1 <1 0 <1 Cadmium ppm ASTM D5185m <1 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 23 11 10 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 59 53 57 Manganese ppm ASTM D5185m 100 59 53 57 Magnesium ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 150 895 812 945 Zinc ppm ASTM D5185m 4250 <	Lead	ppm	ASTM D5185m	>40	1	0	1	
Vanadium ppm ASTM D5185m <1 <1 0 Cadmium ppm ASTM D5185m <1 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 23 11 10 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 59 53 57 Manganese ppm ASTM D5185m 100 59 53 57 Manganesium ppm ASTM D5185m 100 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current histor	Copper	ppm	ASTM D5185m	>330	1	<1	2	
Cadmium ppm ASTM D5185m <1 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 23 11 10 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 59 53 57 Manganese ppm ASTM D5185m 100 59 53 57 Manganesium ppm ASTM D5185m 100 750 701 820 Calcium ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 250 3177 2899 3244 CONTAMINANTS method limit/base	Tin	ppm	ASTM D5185m	>15	<1	0	<1	
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 23 11 10 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 59 53 57 Manganese ppm ASTM D5185m 100 59 53 57 Magnesium ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 3000 1076 1073 1143 Sulfur ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >20 <td>Vanadium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th><1</th> <td><1</td> <td>0</td>	Vanadium	ppm	ASTM D5185m		<1	<1	0	
Boron	Cadmium	ppm	ASTM D5185m		<1	0	<1	
Barium ppm ASTM D5185m 10 0 4 Molybdenum ppm ASTM D5185m 100 59 53 57 Manganese ppm ASTM D5185m 100 1 Magnesium ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1150 895 812 945 Zinc ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum ppm ASTM D5185m 100 59 53 57 Manganese ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1150 895 812 945 Zinc ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415	Boron	ppm	ASTM D5185m	250	23	11	10	
Manganese ppm ASTM D5185m <1 0 1 Magnesium ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1150 895 812 945 Zinc ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0	Barium	ppm	ASTM D5185m	10	0	0	4	
Magnesium ppm ASTM D5185m 450 750 701 820 Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1150 895 812 945 Zinc ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION *ASTM D7414 <t< td=""><td>Molybdenum</td><td>ppm</td><td>ASTM D5185m</td><td>100</td><th>59</th><td>53</td><td>57</td></t<>	Molybdenum	ppm	ASTM D5185m	100	59	53	57	
Calcium ppm ASTM D5185m 3000 1081 1072 1054 Phosphorus ppm ASTM D5185m 1150 895 812 945 Zinc ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION *ASTM D7	Manganese	ppm	ASTM D5185m		<1	0	1	
Phosphorus ppm ASTM D5185m 1150 895 812 945 Zinc ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % "ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm "ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm "ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method	Magnesium	ppm	ASTM D5185m	450	750	701	820	
Zinc ppm ASTM D5185m 1350 1076 1073 1143 Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm <td>Calcium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>3000</td> <th>1081</th> <td>1072</td> <td>1054</td>	Calcium	ppm	ASTM D5185m	3000	1081	1072	1054	
Sulfur ppm ASTM D5185m 4250 3177 2899 3244 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6		ppm	ASTM D5185m	1150	895		945	
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	Zinc	ppm	ASTM D5185m	1350	1076	1073	1143	
Silicon ppm ASTM D5185m >25 4 3 5 Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6			ASTM D5185m	4250	3177	2899	3244	
Sodium ppm ASTM D5185m >216 1 2 2 Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	CONTAMINANTS method limit/base current history1 history2							
Potassium ppm ASTM D5185m >20 2 12 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	Silicon	ppm			4			
INFRA-RED	Sodium	ppm	ASTM D5185m	>216	1			
Soot % % *ASTM D7844 >3 0.1 0.7 0.6 Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	Potassium	ppm	ASTM D5185m	>20	2	12	3	
Nitration Abs/cm *ASTM D7624 >20 4.7 6.7 7.2 Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation Abs/.1mm *ASTM D7415 >30 16.2 17.6 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	Soot %	%	*ASTM D7844	>3	0.1	0.7	0.6	
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	Nitration	Abs/cm	*ASTM D7624	>20	4.7	6.7	7.2	
Oxidation Abs/.1mm *ASTM D7414 >25 11.1 12.1 12.6	Sulfation	Abs/.1mm	*ASTM D7415	>30	16.2	17.6	18.1	
	FLUID DEGRA	OITAC	method	limit/base	current	history1	history2	
Base Number (BN) mg KOH/g ASTM D2896 8.5 8.3 7.7 8.1	Oxidation	Abs/.1mm	*ASTM D7414	>25	11.1	12.1	12.6	
	Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.3	7.7	8.1	

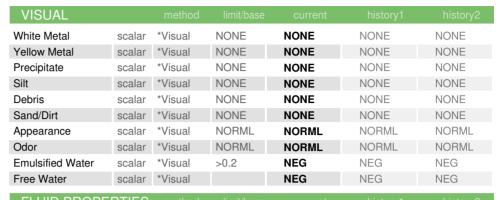


OIL ANALYSIS REPORT



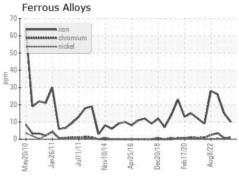


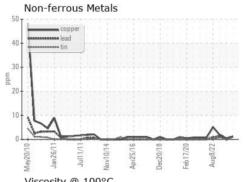


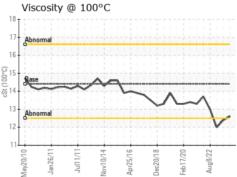


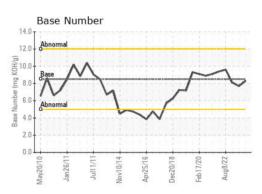
FLUID PROP	ERIIES	method			riistory i	History∠
Visc @ 100°C	cSt	ASTM D445	14.4	12.6	12.4	△ 12.0

GRAPHS













Certificate 12367

Laboratory Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0116761 Lab Number : 06193595 Unique Number : 11050347 Test Package : FLEET

Received : 29 May 2024 **Tested** : 30 May 2024 Diagnosed

: 30 May 2024 - Sean Felton

To discuss this sample report, contact Customer Service at 1-800-237-1369.

 st - 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)

GFL Environmental - 009 - Fairburn

6905 Roosevelt Hwy Fairburn, GA

US 30213 Contact: Eric Jones erjones@gflenv.com

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Submitted By: Eric Jones