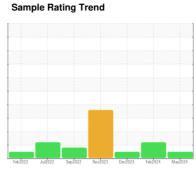


OIL ANALYSIS REPORT







DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Fuel content negligible. 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 limit/base current history1 history2	ON SHP 15W4U (
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Date	Sample Number		Client Info		GFL0115196	GFL0106700	GFL0097739
Machine Age hrs Client Info 19015 18493 17959 Oil Age hrs Client Info 522 534 600 Oil Changed Client Info Changed Changed Changed Changed Sample Status Nethod Imitibase current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imitibase current history1 history2 Iron ppm ASTM D5185n >90 13 10 11 Chromium ppm ASTM D5185n >20 0 <1			Client Info		22 May 2024	12 Feb 2024	03 Dec 2023
Dil Age	•	hrs			-	18493	17959
Contained Client Info Changed Changed Changed NORMAL ABNORMAL NORMAL		hrs	Client Info		522	534	600
NORMAL ABNORMAL ABNORMAL NORMAL	•				-		
Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imit/base current history1 nistory2 WEAR METALS method limit/base current history1 nistory2 Iron ppm ASTM D5185m >90 13 10 11 Chromium ppm ASTM D5185m >20 0 <1 0 Nickel ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >20 3 2 <1 0 0 Silver ppm ASTM D5185m >40 <1 0 0 0 Copper ppm ASTM D5185m >330 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1						Ü	
Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imit/base current history1 nistory2 WEAR METALS method limit/base current history1 nistory2 Iron ppm ASTM D5185m >90 13 10 11 Chromium ppm ASTM D5185m >20 0 <1 0 Nickel ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >20 3 2 <1 0 0 Silver ppm ASTM D5185m >40 <1 0 0 0 Copper ppm ASTM D5185m >330 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS			WC Method	>0.2	NEG	NEG	NEG
Description Description	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 0 <1 0 Nickel ppm ASTM D5185m >2 <1 0 0 Tittanium ppm ASTM D5185m >2 0 0 0 Siliver ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m >20 3 2 <1 Lead ppm ASTM D5185m >40 <1 0 0 Copper ppm ASTM D5185m >40 <1 0 0 Copper ppm ASTM D5185m >15 <1 0 0 Vanadium ppm ASTM D5185m 0 <1 0 0 Cadmium ppm ASTM D5185m 0 <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0	WEAR METAL	.S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>90	13	10	11
Titanium	Chromium	ppm	ASTM D5185m	>20	0	<1	0
Silver	Nickel	ppm	ASTM D5185m	>2	<1	0	0
Silver	Titanium		ASTM D5185m	>2	0	0	0
Aluminum ppm ASTM D5185m >20 3 2 <1 Lead ppm ASTM D5185m >40 <1	Silver		ASTM D5185m	>2	<1	0	0
Lead ppm ASTM D5185m >40 <1 0 0 Copper ppm ASTM D5185m >330 <1 <1 <1 Tin ppm ASTM D5185m >15 <1 0 0 Vanadium ppm ASTM D5185m 0 <1 0 0 Cadmium ppm ASTM D5185m 0 0 <1 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 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 0 0 0 0 ABJ ASTM D5185m 0 0 1169 970 1155	Aluminum		ASTM D5185m	>20	3	2	<1
Copper ppm ASTM D5185m >330 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <td>Lead</td> <td></td> <td>ASTM D5185m</td> <td>>40</td> <th><1</th> <td>0</td> <td>0</td>	Lead		ASTM D5185m	>40	<1	0	0
Trin	Copper		ASTM D5185m	>330	<1	<1	<1
Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 6 7 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 <1 0 0 Manganese ppm ASTM D5185m 1010 880 888 868 Calcium ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4					<1	0	0
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 6 7 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 51 60 Manganese ppm ASTM D5185m 1010 880 888 868 Calcium ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 </td <td>Vanadium</td> <td></td> <td></td> <td></td> <th></th> <td><1</td> <td>0</td>	Vanadium					<1	0
Boron							0
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 57 51 60 Manganese ppm ASTM D5185m 0 <1 0 0 Magnesium ppm ASTM D5185m 1010 880 888 868 Calcium ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1150 1034 1006 1032 Zinc ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m >20 3 <1 0 Fuel % ASTM D3524	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 57 51 60 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	8	6	7
Manganese ppm ASTM D5185m 0 <1 0 0 Magnesium ppm ASTM D5185m 1010 880 888 868 Calcium ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1150 1034 1006 1032 Zinc ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m >20 3 <1	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 880 888 868 Calcium ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1150 1034 1006 1032 Zinc ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m >20 3 <1							
Calcium ppm ASTM D5185m 1070 1169 970 1155 Phosphorus ppm ASTM D5185m 1150 1034 1006 1032 Zinc ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Soliticon ppm ASTM D5185m >25 7 4 4 Soliticon ppm ASTM D5185m >20 3 <1	Molybdenum	ppm	ASTM D5185m	60	57	51	60
Phosphorus ppm ASTM D5185m 1150 1034 1006 1032 Zinc ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m >20 3 <1	-						
Zinc ppm ASTM D5185m 1270 1234 1218 1262 Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m >20 3 <1	Manganese	ppm	ASTM D5185m	0	<1	0	0
Sulfur ppm ASTM D5185m 2060 3322 2959 3258 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m 6 21 2 Potassium ppm ASTM D5185m >20 3 <1	Manganese Magnesium	ppm	ASTM D5185m ASTM D5185m	1010	<1 880	0 888	0 868
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m 6 21 2 Potassium ppm ASTM D5185m >20 3 <1	Manganese Magnesium Calcium	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070	<1 880 1169	0 888 970	0 868 1155
Silicon ppm ASTM D5185m >25 7 4 4 Sodium ppm ASTM D5185m 6 21 2 Potassium ppm ASTM D5185m >20 3 <1 0 Fuel % ASTM D3524 >3.0 0.2 6.4 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.5 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150	<1 880 1169 1034	0 888 970 1006	0 868 1155 1032
Sodium ppm ASTM D5185m 6 21 2 Potassium ppm ASTM D5185m >20 3 <1 0 Fuel % ASTM D3524 >3.0 0.2 6.4 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.5 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270	<1 880 1169 1034 1234	0 888 970 1006 1218	0 868 1155 1032 1262
Potassium ppm ASTM D5185m >20 3 <1 0 Fuel % ASTM D3524 >3.0 0.2 ▲ 6.4 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.5 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060	<1 880 1169 1034 1234 3322	0 888 970 1006 1218 2959	0 868 1155 1032 1262 3258
Fuel % ASTM D3524 >3.0 0.2	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060	<1 880 1169 1034 1234 3322 current	0 888 970 1006 1218 2959 history1	0 868 1155 1032 1262 3258 history2
Fuel % ASTM D3524 >3.0 0.2 ▲ 6.4 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.5 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m	0 1010 1070 1150 1270 2060	<1 880 1169 1034 1234 3322 current	0 888 970 1006 1218 2959 history1	0 868 1155 1032 1262 3258 history2
Soot % % *ASTM D7844 > 6 0.5 0.3 0.3 Nitration Abs/cm *ASTM D7624 > 20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7415 > 30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060 limit/base >25	<1 880 1169 1034 1234 3322 current 7 6	0 888 970 1006 1218 2959 history1 4 21	0 868 1155 1032 1262 3258 history2 4
Nitration Abs/cm *ASTM D7624 >20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7415 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 1010 1070 1150 1270 2060 limit/base >25	<1 880 1169 1034 1234 3322 current 7 6 3	0 888 970 1006 1218 2959 history1 4 21 <1	0 868 1155 1032 1262 3258 history2 4 2
Nitration Abs/cm *ASTM D7624 >20 8.8 8.6 6.7 Sulfation Abs/.1mm *ASTM D7615 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	<1 880 1169 1034 1234 3322 current 7 6 3 0.2	0 888 970 1006 1218 2959 history1 4 21 <1 ▲ 6.4	0 868 1155 1032 1262 3258 history2 4 2 0 <1.0
Sulfation Abs/.1mm *ASTM D7415 >30 20.1 19.4 18.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.8 16.2 14.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524	0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	<1 880 1169 1034 1234 3322 current 7 6 3 0.2 current	0 888 970 1006 1218 2959 history1 4 21 <1 ▲ 6.4	0 868 1155 1032 1262 3258 history2 4 2 0 <1.0
Oxidation	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 method *ASTM D7844	0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base	<1 880 1169 1034 1234 3322 current 7 6 3 0.2 current 0.5	0 888 970 1006 1218 2959 history1 4 21 <1 △ 6.4 history1 0.3	0 868 1155 1032 1262 3258 history2 4 2 0 <1.0 history2
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm	ASTM D5185m ASTM D7844 *ASTM D7844	0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6 >20	<1 880 1169 1034 1234 3322 current 7 6 3 0.2 current 0.5 8.8	0 888 970 1006 1218 2959 history1 4 21 <1 ▲ 6.4 history1 0.3 8.6	0 868 1155 1032 1262 3258 history2 4 2 0 <1.0 history2 0.3 6.7
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D76145	0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6 >20 >30	<1 880 1169 1034 1234 3322 current 7 6 3 0.2 current 0.5 8.8 20.1	0 888 970 1006 1218 2959 history1 4 21 <1 6.4 history1 0.3 8.6 19.4	0 868 1155 1032 1262 3258 history2 4 2 0 <1.0 history2 0.3 6.7 18.6
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAI	ppm	ASTM D5185m Method ASTM D5185m ASTM D7624 *ASTM D7624 *ASTM D7415 method	0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6 >20 >30 limit/base	<1 880 1169 1034 1234 3322 current 7 6 3 0.2 current 0.5 8.8 20.1 current	0 888 970 1006 1218 2959 history1 4 21 <1 ▲ 6.4 history1 0.3 8.6 19.4 history1	0 868 1155 1032 1262 3258 history2 4 2 0 <1.0 history2 0.3 6.7 18.6 history2



OIL ANALYSIS REPORT







Certificate 12367

Laboratory Sample No.

: GFL0115196 Lab Number : 06193402

Unique Number : 11050154

₹ 14

: WearCheck USA - 501 Madison Ave., Cary, NC 27513

Received : 28 May 2024 **Tested** : 30 May 2024 Diagnosed

-eb12/24

: 30 May 2024 - Wes Davis

0.0

GFL Environmental - 405 - Arbor Hills 7811 Chubb Rd NORTHVILLE, MI US 48168

Contact: Anthony Hopkins ahopkins@gflenv.com T:

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.

Test Package : FLEET (Additional Tests: PercentFuel)

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

F: