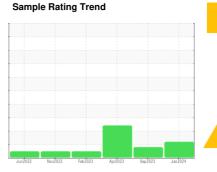


OIL ANALYSIS REPORT







DIAGNOSIS

Recommendation

We advise that you check for possible coolant leak. Check for low coolant level. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal.

Contamination

Sodium and/or potassium levels are high.

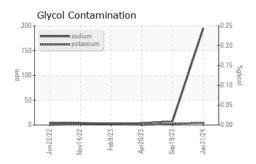
Fluid Condition

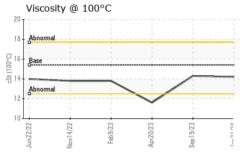
The BN result indicates that there is suitable alkalinity remaining in the oil.

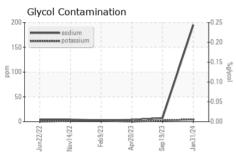
Sample Date	N SHP 15W40 (5 GAL)	Jun2022	Nov2022 Feb2023	Apr2023 Sep2023	Jan2024	
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 16529 15334 14009 Oil Age hrs Client Info 597 628 580 Oil Changed Client Info Changed Changed Changed Sample Status MARORINAL MARGINAL SEVERE CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Sample Number		Client Info		GFL0106673	GFL0087256	GFL0072886
Dil Age	Sample Date		Client Info		31 Jan 2024	19 Sep 2023	20 Apr 2023
Client Info	Machine Age	hrs	Client Info		16529	15334	14009
ABNORMAL MARGINAL Marginal	Oil Age	hrs	Client Info		597	628	580
CONTAMINATION	Oil Changed		Client Info		Changed	Changed	Changed
Wear Wc Method So.2 NEG NEG NEG NEG	Sample Status				ABNORMAL	MARGINAL	SEVERE
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 21 43 9 Chromium ppm ASTM D5185m >20 <1 1 <1 Nickel ppm ASTM D5185m >2 0 <1 0 Silver ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m >20 3 3 1 Lead ppm ASTM D5185m >40 0 0 0 Copper ppm ASTM D5185m >40 0 0 0 Caladium ppm ASTM D5185m 0 0 0 0 Caladium ppm ASTM D5185m 0 15 <1 4	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 21 43 9 Chromium ppm ASTM D5185m >20 <1	Fuel		WC Method	>3.0	<1.0	<u>^</u> 2.1	8.2
Chromium	Water		WC Method	>0.2	NEG	NEG	NEG
Description	WEAR METAL	S	method	limit/base	current	history1	history2
Strickel	ron	ppm	ASTM D5185m	>90	21	43	9
Description	Chromium	ppm	ASTM D5185m	>20	<1	1	<1
Saliver	Nickel	ppm	ASTM D5185m	>2	0	<1	0
Aluminum ppm ASTM D5185m >20 3 3 1 Lead ppm ASTM D5185m >40 0 0 0 Copper ppm ASTM D5185m >330 0 1 Cadmium ppm ASTM D5185m >15 <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 1070 995 1041 1002 Calcium ppm ASTM D5185m 1270 1245 1211 1144 Califur ppm ASTM D5185m 1270 1245 1211 1144 Califur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Cadmium ppm ASTM D5185m >20 4 2 0 Californ Ppm ASTM D5185m >20 10.5 11.8 8.4 Californ Abs/.1mm *ASTM D7844 >6 0.9 1.4 0.3 Californ Abs/.1mm *ASTM D7845 >30 20.9 22.4 17.6 Californ Abs/.1mm *ASTM D7845 >20 10.5 11.8 8.4 Californ Abs/.1mm *ASTM D7844 >25 16.9 18.8 16.7	Titanium	ppm	ASTM D5185m	>2	<1	0	0
Lead ppm ASTM D5185m >40 0 0 0 Copper ppm ASTM D5185m >330 0 1 0 Vanadium ppm ASTM D5185m >15 <1 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 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 41 <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	Silver	ppm	ASTM D5185m	>2	<1	0	0
Copper	Aluminum	ppm	ASTM D5185m	>20	3	3	1
Tim	_ead	ppm	ASTM D5185m	>40	0	0	0
Azanadium 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 15 <1 4 Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 0 <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	Copper	ppm	ASTM D5185m	>330	0	1	0
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 15 <1	Γin	ppm	ASTM D5185m	>15	<1	0	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 15 <1	/anadium	ppm	ASTM D5185m		0	0	0
Soron ppm ASTM D5185m 0 0 0 0 0 0 0 0 0	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 65 58 54 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	15	<1	4
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 868 893 857 Calcium ppm ASTM D5185m 1070 995 1041 1002 Phosphorus ppm ASTM D5185m 1150 1024 994 856 Zinc ppm ASTM D5185m 1270 1245 1211 1144 Sulfur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m >20 4 2 0 Glycol *ASTM D5185m >20 4 2 0 Glycol *ASTM D5185m >20 4 2 0 Glycol *ASTM D5185m >20 NEG NEG NE	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 868 893 857 Calcium ppm ASTM D5185m 1070 995 1041 1002 Phosphorus ppm ASTM D5185m 1150 1024 994 856 Zinc ppm ASTM D5185m 1270 1245 1211 1144 Sulfur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 NEG NEG NEG INFRA-RED method limit/base	Molybdenum	ppm	ASTM D5185m	60	65	58	54
Calcium ppm ASTM D5185m 1070 995 1041 1002 Phosphorus ppm ASTM D5185m 1150 1024 994 856 Zinc ppm ASTM D5185m 1270 1245 1211 1144 Sulfur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Gilicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 10	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 1024 994 856 Zinc ppm ASTM D5185m 1270 1245 1211 1144 Bulfur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Gilicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 MEG NEG NEG NEG NEG NEG INFRA-RED method limit/base current history1	Magnesium	ppm	ASTM D5185m	1010	868	893	857
Zinc ppm ASTM D5185m 1270 1245 1211 1144 Sulfur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 MEG NEG NEG NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4	Calcium	ppm	ASTM D5185m	1070	995	1041	1002
Sulfur ppm ASTM D5185m 2060 2922 2855 2859 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m >20 4 2 0 Potassium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 MEG NEG NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1	Phosphorus	ppm	ASTM D5185m	1150	1024	994	856
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m ▲ 195 7 4 Potassium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 4 2 0 Glycol % *ASTM D5185m >20 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25	Zinc	ppm	ASTM D5185m	1270	1245	1211	1144
Silicon ppm ASTM D5185m >25 8 8 3 Sodium ppm ASTM D5185m ▲ 195 7 4 Potassium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	Sulfur	ppm	ASTM D5185m	2060	2922	2855	2859
Sodium ppm ASTM D5185m ▲ 195 7 4 Potassium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 4 2 0 Glycol % *ASTM D2982 NEG NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	Silicon	ppm	ASTM D5185m	>25	8	8	3
NEG NEG	Sodium	ppm	ASTM D5185m		195	7	4
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	Potassium	ppm	ASTM D5185m	>20	4	2	0
Soot % % *ASTM D7844 > 6 0.9 1.4 0.3 Nitration Abs/cm *ASTM D7624 > 20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 > 30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 16.9 18.8 16.7	Glycol	%	*ASTM D2982		NEG	NEG	NEG
Nitration Abs/cm *ASTM D7624 >20 10.5 11.8 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	Soot %	%	*ASTM D7844	>6	0.9	1.4	0.3
Sulfation Abs/.1mm *ASTM D7415 >30 20.9 22.4 17.6 FLUID DEGRADATION method limit/base current history1 history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 16.9 18.8 16.7	Nitration	Abs/cm	*ASTM D7624	>20	10.5	11.8	8.4
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30		22.4	17.6
	FLUID DEGRAD	OATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	16.9	18.8	16.7
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	7.5	7.6	7.3



OIL ANALYSIS REPORT



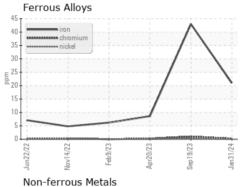


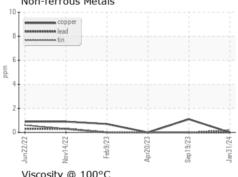


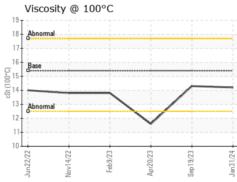
White Metal scalar *Visual NONE NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE Silt scalar *Visual NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE Sand/Dirt scalar *Visual NONE NONE NONE NONE Appearance scalar *Visual NORML NORML NORML NORML Odor scalar *Visual NORML NORML NORML NORML Emulsified Water scalar *Visual >0.2 NEG NEG NEG	VISUAL		method	limit/base	current	history1	history2
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 Emulsified Water scalar *Visual >0.2 NEG NEG NEG	White Metal	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 Emulsified Water scalar *Visual >0.2 NEG NEG NEG	Yellow Metal	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 Emulsified Water scalar *Visual >0.2 NEG NEG NEG	Precipitate	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 Emulsified Water scalar *Visual >0.2 NEG NEG NEG	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGNEG	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Odor scalar *Visual NORML NORML NORML NORML Emulsified Water scalar *Visual >0.2 NEG NEG NEG	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Emulsified Water scalar *Visual >0.2 NEG NEG NEG	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water scalar *Visual NEG NEG NEG	Free Water	scalar	*Visual		NEG	NEG	NEG

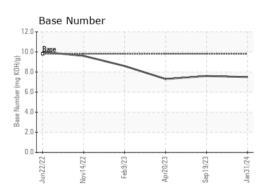
FLUID PROPE	RHES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	14.2	14.3	▲ 11.6

GRAPHS













Laboratory Sample No. Lab Number : 06082282 Unique Number : 10869727

: GFL0106673

Received **Tested** Diagnosed

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : 07 Feb 2024 : 09 Feb 2024

: 09 Feb 2024 - Jonathan Hester

GFL Environmental - 405 - Arbor Hills 7400 Napier Rd NORTHVILLE, MI

US 48168 Contact: John Nahal

Test Package: FLEET (Additional Tests: Glycol) To discuss this sample report, contact Customer Service at 1-800-237-1369. jnahal@gflenv.com

* - 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:

F: