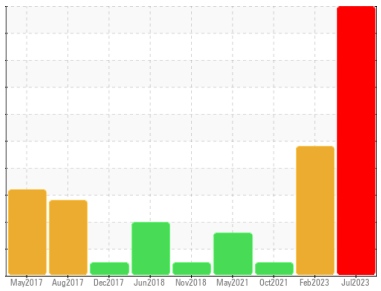
OIL ANALYSIS REPORT

Sample Rating Trend



WEAR

Machine Id
4582
Component
Diesel Engine
Fluid
PETRO CANADA DURON HP 15W40 (--- GAL)

DIAGNOSIS

Recommendation
We advise that you check for the source of the coolant leak. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Wear
Aluminum and iron and nickel ppm levels are severe. Copper ppm levels are abnormal. Cylinder, crank, or cam shaft wear is indicated. Exhaust valve wear is indicated. Piston wear is indicated. Bearing wear is indicated.

Contamination
Fuel content negligible. Test for glycol is positive. There is a moderate concentration of glycol present in the oil.

Fluid Condition
The BN result indicates that there is suitable alkalinity remaining in the oil. Viscosity of sample indicates oil is within SAE 30 range, advise investigate. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**GFL0084286**	GFL0072832	GFL0039038
Sample Date		Client Info		**12 Jul 2023**	16 Feb 2023	28 Oct 2021
Machine Age	hrs	Client Info		**28044**	27909	0
Oil Age	hrs	Client Info		**600**	0	0
Oil Changed		Client Info		**Changed**	N/A	Changed
Sample Status				**SEVERE**	ABNORMAL	NORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*	>30	**0**	---	---
Iron	ppm	ASTM D5185(m)	>110	⬢ **226**	38	40
Chromium	ppm	ASTM D5185(m)	>4	**2**	2	3
Nickel	ppm	ASTM D5185(m)	>2	⬢ **12**	1	1
Titanium	ppm	ASTM D5185(m)		**<1**	<1	0
Silver	ppm	ASTM D5185(m)	>2	**<1**	0	<1
Aluminum	ppm	ASTM D5185(m)	>25	⬢ **83**	4	3
Lead	ppm	ASTM D5185(m)	>45	**16**	2	5
Copper	ppm	ASTM D5185(m)	>85	▲ **128**	1	2
Tin	ppm	ASTM D5185(m)	>4	**<1**	0	<1
Antimony	ppm	ASTM D5185(m)		**0**	<1	<1
Vanadium	ppm	ASTM D5185(m)		**0**	0	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	0	**36**	8	2
Barium	ppm	ASTM D5185(m)	0	**0**	0	0
Molybdenum	ppm	ASTM D5185(m)	60	**67**	60	59
Manganese	ppm	ASTM D5185(m)	0	**6**	<1	<1
Magnesium	ppm	ASTM D5185(m)	1010	**929**	951	1006
Calcium	ppm	ASTM D5185(m)	1070	**956**	1111	1035
Phosphorus	ppm	ASTM D5185(m)	1150	**1035**	1058	1035
Zinc	ppm	ASTM D5185(m)	1270	**1171**	1176	1215
Sulfur	ppm	ASTM D5185(m)	2060	**2483**	2571	2446
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>30	**14**	11	11
Sodium	ppm	ASTM D5185(m)		▲ **895**	▲ 28	5
Potassium	ppm	ASTM D5185(m)	>20	▲ **578**	▲ 14	<1
Fuel	%	ASTM D7593*	>5	**0.8**	<1.0	<1.0
Glycol	%	ASTM D7922*		▲ **0.05**	▲ 0.029	NEG

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*	>3	**0.3**	0.5	0.6
Nitration	Abs/cm	ASTM D7624*	>20	**15.9**	7.5	8.3
Sulfation	Abs/.1mm	ASTM D7415*	>30	**19.7**	21.6	21.8

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	**15.7**	14.8	15.9
Base Number (BN)	mg KOH/g	ASTM D2896*	9.8	**12.65**	---	---

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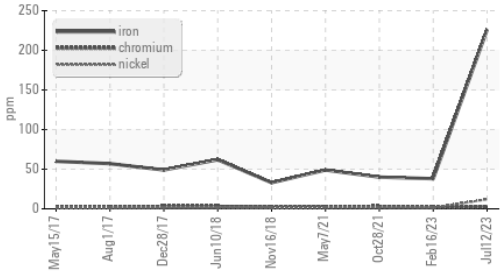
VISUAL		method	limit/base	current	history1	history2
Emulsified Water	scalar	Visual*	>0.2	**NEG**	NEG	NEG
Free Water	scalar	Visual*		**NEG**	NEG	NEG

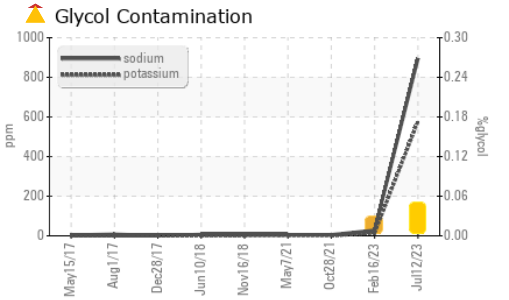
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D7279(m)	15.6	▲ **11.6**	11.3	11.8

GRAPHS

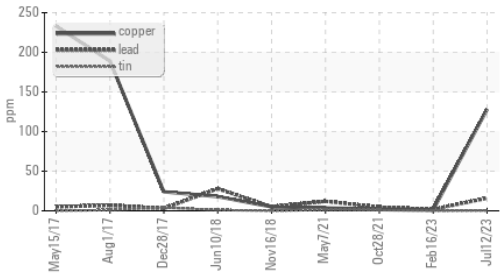
Ferrous Alloys



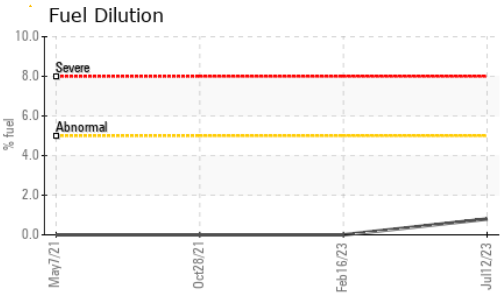
Glycol Contamination



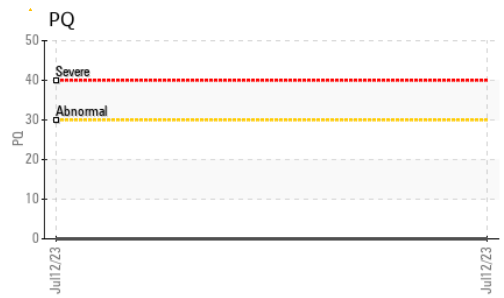
Non-ferrous Metals



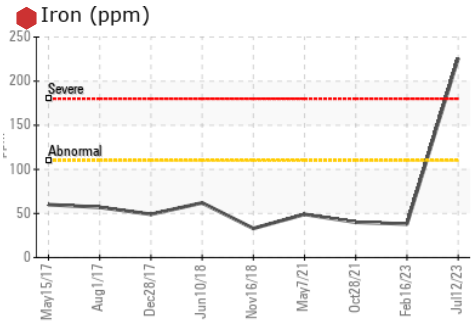
Fuel Dilution



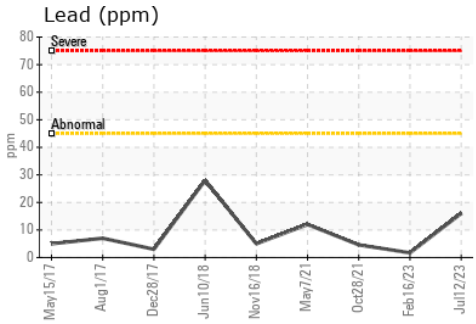
PQ



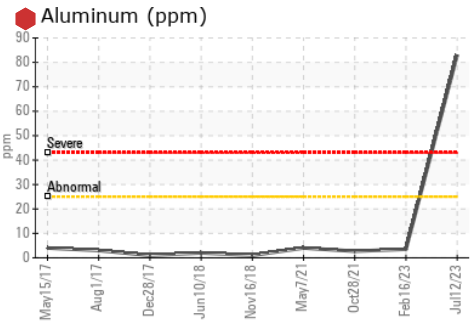
Iron (ppm)



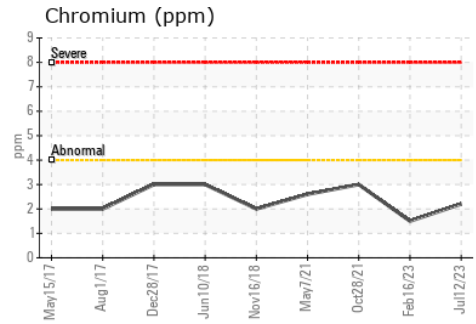
Lead (ppm)



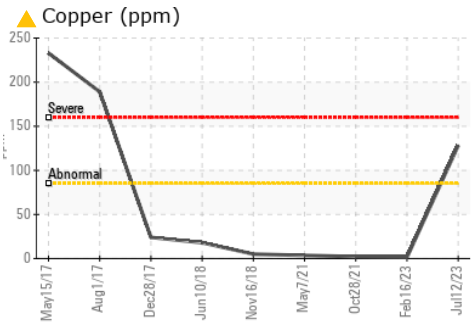
Aluminum (ppm)



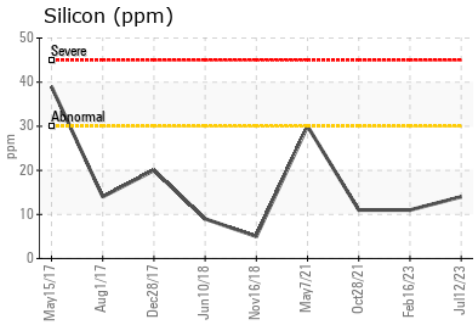
Chromium (ppm)



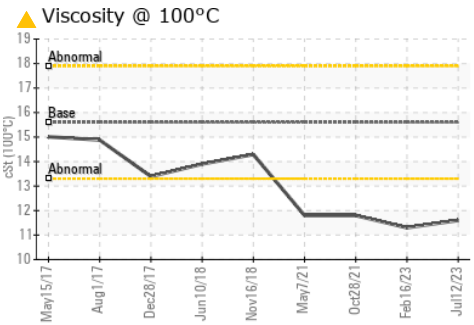
Copper (ppm)



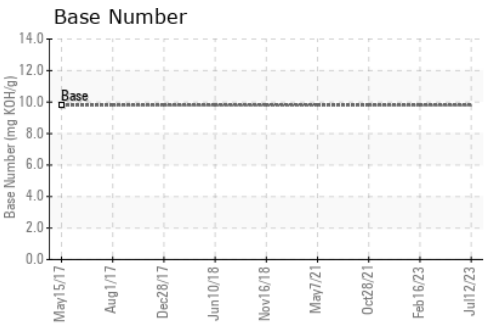
Silicon (ppm)



Viscosity @ 100°C



Base Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 **GFL Environmental - 550 - Rocky View County**
Sample No. : GFL0084286 **Received** : 24 Jul 2023 220 Carmek Blvd
Lab Number : 02571641 **Diagnosed** : 26 Jul 2023 Rocky View County, AB
Unique Number : 5616692 **Diagnostician** : Kevin Marson CA T1X 1X1
Test Package : MOB 2 (Additional Tests: FuelDilution, Glycol, PercentFuel, PQ) Contact: GFL Calgary

To discuss this sample report, contact Customer Service at 1-800-268-2131. calgarymaintenance@gflenv.com
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. T:
Validity of results and interpretation are based on the sample and information as supplied. F: (403)369-6163