

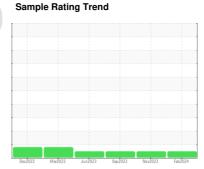
OIL ANALYSIS REPORT



(BC71231) 511022 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (--- GAL)





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

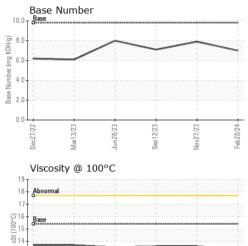
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Number			Dec2022	maizuza Junzuza	Sep2023 Nov2023	Feb2024		
Sample Date	SAMPLE INFO	RMATION	method	limit/base	current	history1	history2	
Machine Age hrs Client Info 3079 2851 2612 Oil Age hrs Client Info 1891 1891 1891 Oil Changed Client Info N/A N/A N/A N/A Sample Status Ned NCRMAL NORMAL NORMAL NORMAL CONTAMINATION method Imitibase current history1 history2 Fuel WC Method >3.0 <1.0	Sample Number		Client Info		GFL0029662	GFL0092957	GFL0092938	
Oil Age hrs Client Info 1891 1891 1891 1891 Oil Changed Client Info N/A N/A N/A N/A N/A Sample Status Client Info N/A N/A N/A N/A N/A CONTAMINATION method limit/base current history1 history2 Fuel WC Method Salo <1.0 <1.0 <1.0 <1.0 Water WC Method Salo <1.0 <1.0 <1.0 <1.0 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM DS185m >120 14 8 24 Chromium ppm ASTM DS185m >120 14 8 24 Chromium ppm ASTM DS185m >20 3 2 6 1 Internation ppm ASTM DS185m >20 3 2 5 Lead ppm AST	Sample Date		Client Info	20 Feb 2024		27 Nov 2023	12 Sep 2023	
Oil Changed Sample Status Client Info N/A N/A N/A N/A N/A N/A N/A N/A N/A Sample Status NORMAL NEG	Machine Age	hrs	Client Info	3079 2851		2851	2612	
Sample Status	Oil Age	hrs	Client Info		1891	1891	1891	
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	Oil Changed		Client Info		N/A	N/A	N/A	
Fuel	Sample Status				NORMAL	NORMAL	NORMAL	
Water Glycol WC Method >0.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 14 8 24 Chromium ppm ASTM D5185m >20 <1	CONTAMINA	NOITA	method	limit/base	current	history1	history2	
Silycol WC Method MEG NEG NEG WEAR METALS method limit/base current history1 history2	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0	
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 14 8 24 Chromium ppm ASTM D5185m >20 <1	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium ppm ASTM D5185m >20 <1	WEAR META	ALS	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>120	14	8	24	
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	0	1	
Silver ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >20 3 2 5 Lead ppm ASTM D5185m >40 1 0 3 Copper ppm ASTM D5185m >330 14 10 44 Tin ppm ASTM D5185m >15 2 <1 3 Vanadium ppm ASTM D5185m -<1 0 0 0 Cadmium ppm ASTM D5185m 0 2 1 <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 1 <1 4 Barium ppm ASTM D5185m 0 2 1 <1 Barium ppm ASTM D5185m 0 0 6 6 6 6 6 6 6	Nickel	ppm	ASTM D5185m	>15	3	2	6	
Aluminum	Titanium	ppm	ASTM D5185m	>2	<1	0	<1	
Lead ppm ASTM D5185m >40 1 0 3 Copper ppm ASTM D5185m >330 14 10 44 Tin ppm ASTM D5185m >15 2 <1 3 Vanadium ppm ASTM D5185m <1 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 1 <1	Silver	ppm	ASTM D5185m	>3	0	0	<1	
Copper ppm ASTM D5185m >330 14 10 44 Tin ppm ASTM D5185m >15 2 <1	Aluminum	ppm	ASTM D5185m	>20	3	2	5	
Tin ppm ASTM D5185m >15 2 <1 3 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 1 <1	Lead	ppm	ASTM D5185m	>40	1	0	3	
Tin ppm ASTM D5185m >15 2 <1 3 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 ADDITIVES method limit/base current history1 history2 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 0 2 1 4 4 Magnesium ppm ASTM D5185m 1010 966 989 916 916 989 916 916 989 916 <th>Copper</th> <td>ppm</td> <td>ASTM D5185m</td> <td>>330</td> <th>14</th> <td>10</td> <td>44</td>	Copper	ppm	ASTM D5185m	>330	14	10	44	
Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 1 <1 Barium ppm ASTM D5185m 0 0 0 44 Molybdenum ppm ASTM D5185m 0 66 61 60 Manganese ppm ASTM D5185m 0 <1 0 2 Magnesium ppm ASTM D5185m 1010 966 989 916 Calcium ppm ASTM D5185m 1070 1038 1132 1036 Phosphorus ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silic			ASTM D5185m	>15	2	<1	3	
Cadmium ppm ASTM D5185m 0 o current history1 history2 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 1 <1	Vanadium	ppm	ASTM D5185m		<1	0	0	
Boron ppm ASTM D5185m 0 2 1 <1 Barium ppm ASTM D5185m 0 0 0 44 Molybdenum ppm ASTM D5185m 60 66 61 60 Manganese ppm ASTM D5185m 0 <1 0 2 Magnesium ppm ASTM D5185m 1010 966 989 916 Calcium ppm ASTM D5185m 1070 1038 1132 1036 Phosphorus ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >225 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base cur	Cadmium		ASTM D5185m		0	0	<1	
Barium ppm ASTM D5185m 0 0 44 Molybdenum ppm ASTM D5185m 60 66 61 60 Manganese ppm ASTM D5185m 1010 966 989 916 Calcium ppm ASTM D5185m 1070 1038 1132 1036 Phosphorus ppm ASTM D5185m 1150 1028 1045 886 Zinc ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 <t< th=""><th>ADDITIVES</th><th></th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></t<>	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum ppm ASTM D5185m 60 66 61 60 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	2	1	<1	
Manganese ppm ASTM D5185m 0 <1 0 2 Magnesium ppm ASTM D5185m 1010 966 989 916 Calcium ppm ASTM D5185m 1070 1038 1132 1036 Phosphorus ppm ASTM D5185m 1150 1028 1045 886 Zinc ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D74	Barium	ppm	ASTM D5185m	0	0	0	44	
Magnesium ppm ASTM D5185m 1010 966 989 916 Calcium ppm ASTM D5185m 1070 1038 1132 1036 Phosphorus ppm ASTM D5185m 1150 1028 1045 886 Zinc ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7	Molybdenum	ppm	ASTM D5185m	60	66	61	60	
Calcium ppm ASTM D5185m 1070 1038 1132 1036 Phosphorus ppm ASTM D5185m 1150 1028 1045 886 Zinc ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm <	Manganese	ppm	ASTM D5185m	0	<1	0	2	
Phosphorus ppm ASTM D5185m 1150 1028 1045 886 Zinc ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs	Magnesium	ppm	ASTM D5185m	1010	966	989	916	
Zinc ppm ASTM D5185m 1270 1233 1271 1164 Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Calcium	ppm	ASTM D5185m	1070	1038	1132	1036	
Sulfur ppm ASTM D5185m 2060 2905 2979 2624 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Phosphorus	ppm	ASTM D5185m	1150	1028	1045	886	
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m 1 1 2 Potassium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Zinc	ppm	ASTM D5185m	1270	1233	1271	1164	
Silicon ppm ASTM D5185m >25 6 4 8 Sodium ppm ASTM D5185m 1 1 2 Potassium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Sulfur	ppm	ASTM D5185m	2060	2905	2979	2624	
Sodium ppm ASTM D5185m 1 1 2 Potassium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	CONTAMINA	ANTS	method	limit/base	current	history1	history2	
Potassium ppm ASTM D5185m >20 7 3 16 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Silicon	ppm	ASTM D5185m	>25	6	4	8	
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Sodium	ppm	ASTM D5185m		1	1	2	
Soot % % *ASTM D7844 >4 0.5 0.4 0.6 Nitration Abs/cm *ASTM D7624 >20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Potassium	ppm	ASTM D5185m	>20	7	3	16	
Nitration Abs/cm *ASTM D7624 > 20 9.4 7.5 9.6 Sulfation Abs/.1mm *ASTM D7415 > 30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 15.6 14.6 15.5	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation Abs/.1mm *ASTM D7415 >30 19.6 19.0 19.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Soot %	%	*ASTM D7844	>4	0.5	0.4	0.6	
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Nitration	Abs/cm	*ASTM D7624	>20	9.4	7.5	9.6	
Oxidation Abs/.1mm *ASTM D7414 >25 15.6 14.6 15.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	19.6	19.0	19.8	
	FLUID DEGR	ADATION	method	limit/base	current	history1	history2	
Base Number (BN) mg KOH/g ASTM D2896 9.8 7 7.9 7.1	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.6	14.6	15.5	
	Base Number (BN	N) mg KOH/g	ASTM D2896	9.8	7	7.9	7.1	



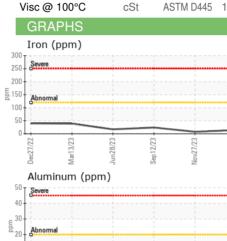
12

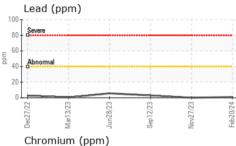
OIL ANALYSIS REPORT

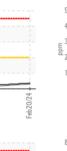


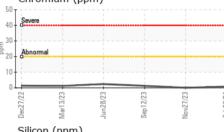
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	DTIES	method	limit/base	current	history1	history2
LEGID FROFE	.nneo	method			HISTOLAL	HISTOLYZ

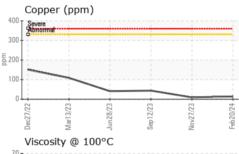
FLUID PROF	PERTIES	method			history1	history2	
 Visc @ 100°C	cSt	ASTM D445	15.4	13.3	13.6	13.6	
 GRAPHS							



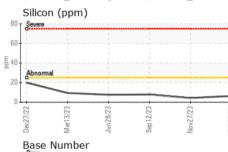


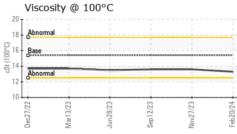


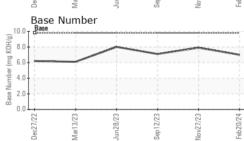




Sep12/23









Certificate L2367

Laboratory Sample No.

Lab Number : 06105752 Unique Number : 10903982

: GFL0029662

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received :01 Mar 2024 **Tested** Diagnosed

: 01 Mar 2024 : 01 Mar 2024 - Wes Davis

GFL Environmental - 463 - Cheboygan

501 N. Western Ave Cheboygan, MI US 49721 Contact: Chris Gee cgee@gflenv.com

T: (231)597-8553

Test Package : MOB1+ 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)

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