

RECOMMENDATION

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS						
Sample Status				ABNORMAL	NORMAL	NORMAL
Iron	ppm	ASTM D5185m	>120	🔺 145	2	19
Silicon	ppm	ASTM D5185m	>25	A 31	3	3

Customer Id: GFL455 Sample No.: GFL0080831 Lab Number: 05940577 Test Package: FLEET



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To discuss the diagnosis or test data: Doug Bogart +1 (800)237-1369 x4016 <u>dougb@wearcheckusa.com</u>

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com

RECOMMENDED	ACTIONS			
Action	Status	Date	Done By	Description
Resample			?	We recommend an early resample to monitor this condition.

HISTORICAL DIAGNOSIS



Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



view report

17 Apr 2023 Diag: Wes Davis

17 May 2023 Diag: Wes Davis



Resample at the next service interval to monitor. Metal levels are typical for a new component breaking in. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



17 Jan 2023 Diag: Jonathan Hester

We advise that you check for the source of the 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.All component wear rates are normal. Sodium and/or potassium levels are high. The BN result indicates that there is suitable alkalinity remaining in the oil.



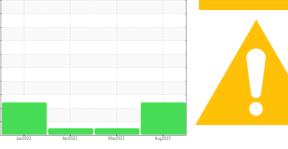






OIL ANALYSIS REPORT

Sample Rating Trend



DIRT

528075 Component **Diesel Engine** Fluid

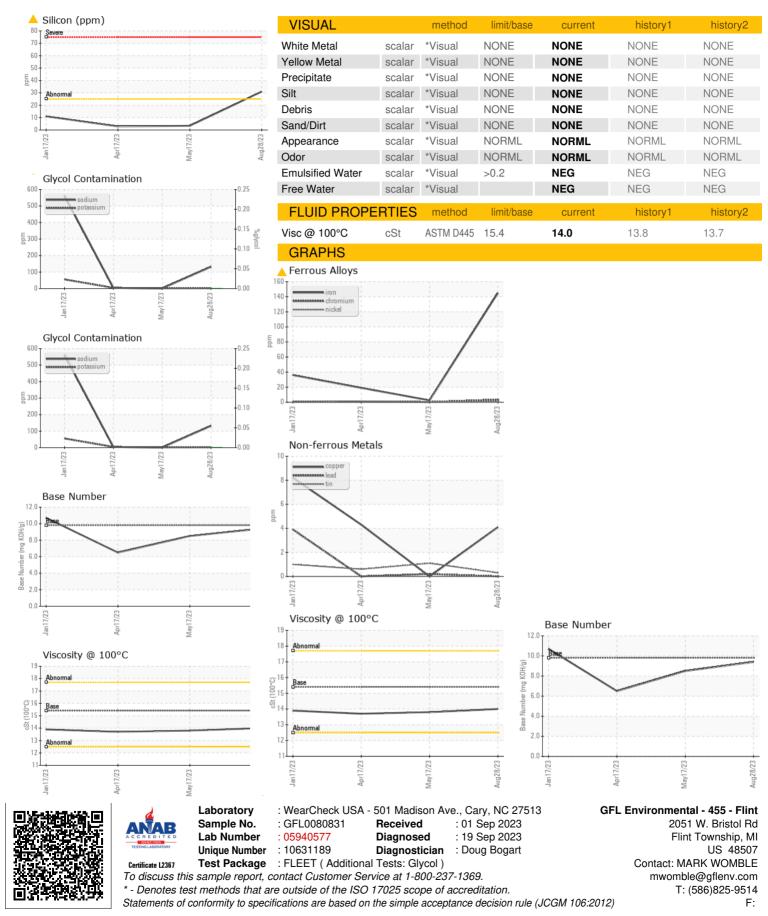
Machine Id

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

Recommendation Sample Number Client Info GFL080831 GFL080871 GFL080874 GFL080874 No non-inversive action is recommended at this time (monton				Jan202	3 Apr2023		ug2023	
work Signap Date Citerat Info 280043 0 17 Apr 2023 14 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 </th <th>DIAGNOSIS</th> <th>SAMPLE INFOR</th> <th>MATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	DIAGNOSIS	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
We recommend an early resample to monitor its, Wear yinder, crank, or cam shalt wear is indicated. Cortanianto Cortanianto Contanianto Reconstruction indicating ingress of seal material. Test for globols regative. Pid Condition Ite of sile of seal material. Test for globols ite suitable ite suitable for lumber is suitable ite suitabl	Recommendation	Sample Number		Client Info		GFL0080831	GFL0080762	GFL0080744
Oraclian. Oil Age mile Old Age mile Old Age mile Old Age Wear Onl Age mile Old Age mile Old Age 0 0 On Made Not Changed Changed On Made Not Changed Changed On Made ABNORMAL Changed On Made ABNORMAL On Made Changed <	No corrective action is recommended at this time.	Sample Date		Client Info		28 Aug 2023	17 May 2023	17 Apr 2023
Wear Dir Jage Dir Lineary Dir Lineary <thdir lineary<="" th=""> <thdir l<="" td=""><td>· ·</td><td>Machine Age</td><td>mls</td><td>Client Info</td><td></td><th>206043</th><td>0</td><td>197633</td></thdir></thdir>	· ·	Machine Age	mls	Client Info		206043	0	197633
Cylinder, crank, or cam shaft wear is indicated. Contaniation Contani		Oil Age	mls	Client Info		206043		
Contamination Contamination Including Including Including Including Including Including Emendial level of silicon (S) above normal indicating ingress of seal material. Test for glycoh is regarize. WC Method >3.0 <1.0		Oil Changed		Client Info		Not Changd	Not Changd	Changed
Elemental leval of silicon (Si) above normal indicating ingress of seal material. Test for glycol is egalive. CONTAMINATION method limitbase current history1 history2 Fuel WC Method >3.0 <1.0		Sample Status				ABNORMAL	NORMAL	NORMAL
Indicating ingress of seal material. Test for glycol is gaine. Fuel WC Method >3.0 <1.0	Contamination Elemental level of silicon (Si) above normal	CONTAMINAT	ION	method	limit/base	current	history1	history2
Puid Condition WEAR METALS method limitose current history1 history2 Iron ppm ASTM 05165m >12.0 ▲ 145 2 19 Silvarius ppm ASTM 05165m >5.2 4 1 1 Silvar ppm ASTM 05165m >2 0 0 0 Silvar ppm ASTM 05165m >2 0 0 0 AUminium ppm ASTM 05165m >2 0 0 0 AUminium ppm ASTM 05165m >2 0 0 0 Copper ppm ASTM 05165m >40 0 4 1 -1 Variandium ppm ASTM 05165m >40 0	ndicating ingress of seal material. Test for glycol is	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
The BV result indicates that there is suitable is suitable for further service. Iron pm ASTM 05165 >20 A 145 2 10 Likalinity remaining in the oil. The condition of the ill is suitable for further service. Nice pm ASTM 05165 >20 C1 <1		WEAR METAL	.S	method	limit/base	current	history1	history2
Nickel ppm ASTL 05185m >2 <1		Iron	ppm	ASTM D5185m	>120	145	2	19
Titatianianiam ppmi Astim Dotabian >2 0 0 Silver ppm Astim Dotabian >2 0 0 0 Silver ppm Astim Dotabian >20 0 0 0 Aluminum ppm Astim Dotabian >20 0 0 0 Aluminum ppm Astim Dotabian >330 4 0 4 Vanadium ppm Astim Dotabian >330 4 0 4 Vanadium ppm Astim Dotabian >330 4 0 0 Cadmium ppm Astim Dotabian 0 0 0 0 ADDITIVES method limit/base current history1 history1 history1 Boron ppm Astim Dotabian 0 1 1 1 1 Magnaesee ppm Astim Dotabian 0 100 1032 965 63 Calcium ppm Astim Dotabian 100 1032 965 1311 1247	Ikalinity remaining in the oil. The condition of the	Chromium	ppm	ASTM D5185m	>20	3	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Auminum ppm ASTM D5185m >20 6 2 2 Lead ppm ASTM D5185m >200 6 2 2 Copper ppm ASTM D5185m >330 4 0 4 Tin ppm ASTM D5185m >15 <1 1 <1 Vanadum ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 10 0 0 0 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 0 0 12 5 1 Barium ppm ASTM D5185m 0 0 1 1< 1< 1 Molybdenum ppm ASTM D5185m 1010 1032 952 953 953 Calaium ppm ASTM D5185m 1070 1124 1079 10855 Calaium	il is suitable for further service.	Nickel	ppm	ASTM D5185m	>5	<1	<1	1
Aluminum ppm ASTM D5185m >20 6 2 2 Lead ppm ASTM D5185m >40 0 <1		Titanium	ppm	ASTM D5185m	>2	<1	0	0
Lead ppm ASTM D5165m >>40 0 <1		Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 4 0 4 Tin ppm ASTM D5185m >15 <1		Aluminum	ppm	ASTM D5185m	>20	6	2	2
Tin ppm ASTM D5185n >15 <1 1 <1 Vanadium ppm ASTM D5185n 0 0 0 Cadmium ppm ASTM D5185n 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185n 0 12 5 1 Barium ppm ASTM D5185n 0 0 0 0 Molybdenum ppm ASTM D5185n 0 12 59 60 Magnesize ppm ASTM D5185n 1010 1032 952 965 Calcium ppm ASTM D5185n 1070 1124 17 141 14 Magnesize ppm ASTM D5185n 1070 1124 1079 1085 Calcium ppm ASTM D5185n 1150 1092 1066 967 Zinc ppm ASTM D5185n 1270 1286 1311 1247 Sulfur ppm ASTM D5185n 25 <td></td> <td>Lead</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>40</td> <th>0</th> <td><1</td> <td>0</td>		Lead	ppm	ASTM D5185m	>40	0	<1	0
Vanadium 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 12 5 1 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 72 59 60 Manganesse ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1070 1124 1079 1085 Phosphorus ppm ASTM D5185m 1010 1032 330 3191 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 25 313 3		Copper	ppm	ASTM D5185m	>330	4	0	4
Cadmium prm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 12 5 1 Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 0 1 <1 10 11 11 Maganesium ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1070 1124 1079 1085 Phosphorus ppm ASTM D5185m 1070 1124 1079 1085 Suffur ppm ASTM D5185m 1070 1124 1079 1085 Suffur ppm ASTM D5185m 2060 3852 3890 3191 CONTAMIINANTS method imit/base current history1 history2 Suffur ppm ASTM D5185m 200 2 1 4 Optassium <th< td=""><td></td><td>Tin</td><td>ppm</td><td>ASTM D5185m</td><td>>15</td><th><1</th><td>1</td><td><1</td></th<>		Tin	ppm	ASTM D5185m	>15	<1	1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 12 5 1 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 72 59 60 Manganese ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1010 1032 966 967 Zinc ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 122 3890 3191 3 3 CONTAMINANTS method limit/base current history1 4 Potassium ppm ASTM D5185m 22 31 3 3 Godum ppm ASTM D51		Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 12 5 1 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 72 59 60 Manganese ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1101 1032 952 965 Calcium ppm ASTM D5185m 1070 1124 1070 1032 Phosphorus ppm ASTM D5185m 1070 1092 1066 967 Zinco ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 1270 1385 3191 Sulfur ppm ASTM D5185m 2060 3852 3890 3191 Sulfur ppm ASTM D5185m 20 1312 <14		Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 72 59 60 Manganese ppm ASTM D5185m 0 1 <1		ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 72 59 60 Manganese ppm ASTM D5185m 0 1 <1		Boron	ppm	ASTM D5185m	0	12	5	1
Manganese ppm ASTM D5185m 0 1 <1 1 Magnesium ppm ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1070 1124 1079 1085 Phosphorus ppm ASTM D5185m 1150 1092 1066 967 Zinc ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 2060 3852 3890 3191 CONTAMINANTS method imit/base current history1 history2 Silicon ppm ASTM D5185m >206 31 3 3 Sodium ppm ASTM D5185m >20 2 1 4 Potassium ppm ASTM D5185m >20 2 1 4 Glycol % YASTM D5185m >20 2 1 4 Glycol % YASTM D5282 0.0 NEG NEG Soot % % YASTM D7844 >4		Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium prime ASTM D5185m 1010 1032 952 965 Calcium ppm ASTM D5185m 1070 1124 1079 1085 Phosphorus ppm ASTM D5185m 1150 1092 1066 967 Zinc ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 2060 3852 3890 3191 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 31 3 3 Sodium ppm ASTM D5185m >20 21 4 Potassium ppm ASTM D5185m >20 2 14 4 Glycol % 'ASTM D5185m >20 2 14 4 Sodium ppm ASTM D5185m >20 2 14 4 Otassium ppm ASTM D5185m >20 2 1 4 Sodium ppm ASTM D5185m >20 </td <td></td> <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>60</td> <th>72</th> <td>59</td> <td>60</td>		Molybdenum	ppm	ASTM D5185m	60	72	59	60
Calcium ppm ASTM D5185m 1070 1124 1079 1085 Phosphorus ppm ASTM D5185m 1150 1092 1066 967 Zinc ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 2060 3852 3890 3191 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 31 3 3 Sodium ppm ASTM D5185m >25 31 3 3 Sodium ppm ASTM D5185m >20 2 1 4 Potassium ppm ASTM D5185m >20 2 1 4 Glycol % *ASTM D2982 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 1.1 Nitration Abs/:m *ASTM D7745 >30 </td <td></td> <td>Manganese</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <th>1</th> <td><1</td> <td>1</td>		Manganese	ppm	ASTM D5185m	0	1	<1	1
Phosphorus ppm ASTM D5185m 1150 1092 1066 967 Zinc ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 2060 3852 3890 3191 CONTAMINANTS method limit/bass current history1 history2 Silicon ppm ASTM D5185m >25 31 3 3 Sodium ppm ASTM D5185m >25 314 3 3 Sodium ppm ASTM D5185m >20 2 1 4 Potassium ppm ASTM D5185m >20 2 1 4 Glycol % *ASTM D2982 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % %ASTM D7844 >4 0.2 0.2 1.1 Nitration Abs/rm *ASTM D7824 >20 4.7 5.8 8.8 Sulfation Abs/rm *ASTM D7845 >30		Magnesium	ppm	ASTM D5185m	1010	1032	952	965
Zinc ppm ASTM D5185m 1270 1286 1311 1247 Sulfur ppm ASTM D5185m 2060 3852 3890 3191 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 ▲ 31 3 3 Sodium ppm ASTM D5185m >25 ▲ 31 3 3 Sodium ppm ASTM D5185m >20 2 1 4 Potassium ppm ASTM D2982 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 1.1 Nitration Abs/tm *ASTM D7414 >20 4.7 5.8 8.8 Sulfation Abs/tm *ASTM D7415 >30 17.0 18.6 19.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/tm *ASTM D741		Calcium	ppm	ASTM D5185m	1070	1124	1079	1085
SulfurppmASTM D5185m2060385238903191CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>253133SodiumppmASTM D5185m>20132<1		Phosphorus	ppm	ASTM D5185m	1150	1092	1066	967
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>253133SodiumppmASTM D5185m>20132<1		Zinc	ppm	ASTM D5185m	1270	1286	1311	1247
SiliconppmASTM D5185m>25▲ 3133SodiumppmASTM D5185m132<1		Sulfur	ppm	ASTM D5185m	2060	3852	3890	3191
SodiumppmASTM D5185m132<14PotassiumppmASTM D5185m>20214Glycol%*ASTM D29820.0NEGNEGINFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.20.21.1NitrationAbs/cm*ASTM D7624>204.75.88.8SulfationAbs/.1mm*ASTM D7415>3017.018.619.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2512.314.115.2		CONTAMINAN	ITS	method	limit/base	current	history1	history2
PotassiumppmASTM D5185m>20214Glycol%*ASTM D29820.0NEGNEGINFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.20.21.1NitrationAbs/cm*ASTM D7624>204.75.88.8SulfationAbs/.1mm*ASTM D7415>3017.018.619.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2512.314.115.2		Silicon	ppm	ASTM D5185m	>25	A 31	3	3
Glycol%*ASTM D29820.0NEGNEGINFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.20.21.1NitrationAbs/cm*ASTM D7624>204.75.88.8SulfationAbs/.1mm*ASTM D7415>3017.018.619.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2512.314.115.2		Sodium	ppm	ASTM D5185m		132	<1	4
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.20.21.1NitrationAbs/cm*ASTM D7624>204.75.88.8SulfationAbs/limm*ASTM D7415>3017.018.619.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/limm*ASTM D7414>2512.314.115.2		Potassium	ppm	ASTM D5185m	>20	2	1	4
Soot % % *ASTM D7844 >4 0.2 0.2 1.1 Nitration Abs/cm *ASTM D7624 >20 4.7 5.8 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 17.0 18.6 19.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.3 14.1 15.2		Glycol	%	*ASTM D2982		0.0	NEG	NEG
Nitration Abs/cm *ASTM D7624 >20 4.7 5.8 8.8 Sulfation Abs/.1mm *ASTM D7415 >30 17.0 18.6 19.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.3 14.1 15.2		INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 17.0 18.6 19.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.3 14.1 15.2		Soot %	%	*ASTM D7844	>4	0.2	0.2	1.1
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2512.314.115.2		Nitration	Abs/cm	*ASTM D7624	>20	4.7	5.8	8.8
Oxidation Abs/.1mm *ASTM D7414 >25 12.3 14.1 15.2		Sulfation	Abs/.1mm	*ASTM D7415	>30	17.0	18.6	19.4
		FLUID DEGRAI		method	limit/base	current	history1	history2
		Oxidation	Abs/.1mm	*ASTM D7414	>25	12.3	14.1	15.2
		Base Number (BN)	mg KOH/g	ASTM D2896	9.8			6.5



OIL ANALYSIS REPORT



Submitted By: MARK WOMBLE

Page 4 of 4