

OIL ANALYSIS REPORT

Sample Rating Trend





Machine Id 913068

Fluid

Component Diesel Engine

PETRO CANADA DURON SHP 15W40 (9 GAL)

Sample Number Client Info GFL0089117 GFL0101603 GFL0304 Sample Date Client Info 20 Nov 2023 16 Nov 2023 09 May 20 Machine Age hrs Client Info 3494 3470 1919 Oil Age hrs Client Info Changed NORMAL NORMAL NORMAL CONTAMINATION method imit/base current History1 History1<		. ,	Dec2022	Feb2023	May2023 Nov2023	Nov2023	
Sample Date Client Info 20 Nov 2023 16 Nov 2023 09 May 20 Machine Age hrs Client Info 3494 3470 1919 Oil Age hrs Client Info 3494 3470 1919 1271 Oil Changed Client Info Changed Changed Changed Changed Changed NORMAL NORMAL NORMAL CONTAMINATION method imit/base current history1 history1 history1 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG flyool WC Method >0 11 <1 <1 <1 form ppm ASTM D5185m >20 1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <th>SAMPLE INFOR</th> <th>RMATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history</th>	SAMPLE INFOR	RMATION	method	limit/base	current	history1	history
Machine Age hrs Client Info 3494 3470 1919 Oil Age hrs Client Info 3470 1919 1271 Oil Changed Client Info 3494 3470 1919 1271 Oil Changed Client Info MCMethod NORMAL NORMAL NORMAL Versite WC Method >.0 <1.0	Sample Number		Client Info		GFL0089117	GFL0101603	GFL00814
Oil Age Ins Client Info 3470 1919 1271 Oil Changed Client Info Changed NORMAL	Sample Date		Client Info		20 Nov 2023	16 Nov 2023	09 May 20
Oil Changed Sample Status Client Info Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL CONTAMINATION method iimit/base current history1 history1 Fuel WC Method >3.0 <1.0	Machine Age	hrs	Client Info		3494	3470	1919
Sample Status Imit base Current NoRMAL NoRMAL CONTAMINATION method Imit/base current history1 history1 Fuel WC Method >3.0 <1.0	Oil Age	hrs	Client Info		3470	1919	1271
CONTAMINATION method limit/base current history1 history1 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		Changed	Changed	Changed
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 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	Sample Status				NORMAL	NORMAL	NORMAL
Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method Imit/base current history1 history1 Iron ppm ASTM D5185m >120 31 13 16 Chromium ppm ASTM D5185m >20 1 <1	CONTAMINA	TION	method	limit/base	current	history1	history
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >120 31 13 16 Chromium ppm ASTM D5185m >20 1 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >120 31 13 16 Chromium ppm ASTM D5185m >20 1 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron ppm ASTM D5185m >12.0 31 1.3 16 Chromium ppm ASTM D5185m >2.0 1 <1	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 1 <1 <1 <1 Nickel ppm ASTM D5185m >5 0 6 4 Titanium ppm ASTM D5185m >2 <1	WEAR META	LS	method	limit/base	current	history1	history
Nickel ppm ASTM D5185m >5 0 6 4 Titanium ppm ASTM D5185m >2 <1	Iron	ppm	ASTM D5185m	>120	31	13	16
Titanium ppm ASTM D5185m >2 <1 <1 0 Silver ppm ASTM D5185m >2 0 <1	Chromium	ppm	ASTM D5185m	>20	1	<1	<1
Silver ppm ASTM D5185m >2 0 <1 <1 Aluminum ppm ASTM D5185m >20 6 1 2 Lead ppm ASTM D5185m >40 <1	Nickel	ppm	ASTM D5185m	>5	0	6	4
Aluminum ppm ASTM D5185m >20 6 1 2 Lead ppm ASTM D5185m >40 <1	Titanium	ppm	ASTM D5185m	>2	<1	<1	0
Aluminum ppm ASTM D5185m >20 6 1 2 Lead ppm ASTM D5185m >40 <1	Silver	ppm	ASTM D5185m	>2	0	<1	<1
Copper ppm ASTM D5185m >330 6 3 6 Tin ppm ASTM D5185m >15 <1	Aluminum		ASTM D5185m	>20	6	1	2
Copper ppm ASTM D5185m >330 6 3 6 Tin ppm ASTM D5185m >15 <1	Lead	ppm	ASTM D5185m	>40	<1	0	0
Tin ppm ASTM D5185m >15 <1 <1 2 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 40 0 4 Barium ppm ASTM D5185m 0 2 0 0 Molybdenum ppm ASTM D5185m 0 2 1 41 Magnesium ppm ASTM D5185m 1010 662 893 1029 Calcium ppm ASTM D5185m 1070 1580 1054 1144 Phosphorus ppm ASTM D5185m 1270 1253 1171 1439 Sulfar ppm ASTM D5185m 2660 3341 2928 3985 CONTAMINAT method limit/base current	Copper		ASTM D5185m	>330	6	3	6
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 40 0 4 Barium ppm ASTM D5185m 0 2 0 0 Magnesium ppm ASTM D5185m 0 2 0 0 Magnesium ppm ASTM D5185m 0 2 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 6622 893 1029 Calcium ppm ASTM D5185m 1070 1580 1054 1144 Phosphorus ppm ASTM D5185m 1270 1253 1171 1439 Sulfur ppm ASTM D5185m 225 12 4 4 Sodium ppm ASTM D5185m 225 <td></td> <td></td> <td>ASTM D5185m</td> <td>>15</td> <th><1</th> <td><1</td> <td>2</td>			ASTM D5185m	>15	<1	<1	2
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 40 0 4 Barium ppm ASTM D5185m 0 2 0 0 Molybdenum ppm ASTM D5185m 60 44 59 66 Magnesium ppm ASTM D5185m 0 2 <1	Vanadium		ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 40 0 4 Barium ppm ASTM D5185m 0 2 0 0 Molybdenum ppm ASTM D5185m 60 44 59 66 Manganese ppm ASTM D5185m 0 2 <1	Cadmium						
Barium ppm ASTM D5185m 0 2 0 0 Molybdenum ppm ASTM D5185m 60 44 59 66 Manganese ppm ASTM D5185m 0 2 <1	ADDITIVES		method	limit/base	current	history1	history
Molybdenum ppm ASTM D5185m 60 44 59 66 Manganese ppm ASTM D5185m 0 2 <1	Boron	ppm	ASTM D5185m	0	40	0	4
Maganese ppm ASTM D5185m 0 2 <1 <1 Magnesium ppm ASTM D5185m 1010 662 893 1029 Calcium ppm ASTM D5185m 1070 1580 1054 1144 Phosphorus ppm ASTM D5185m 1070 1580 1054 1144 Phosphorus ppm ASTM D5185m 1070 1253 1171 1439 Zinc ppm ASTM D5185m 2060 3341 2928 3985 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/.mm *ASTM D7415 <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <th>2</th> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185m	0	2	0	0
Magnesium ppm ASTM D5185m 1010 662 893 1029 Calcium ppm ASTM D5185m 1070 1580 1054 1144 Phosphorus ppm ASTM D5185m 1170 1253 1171 1439 Zinc ppm ASTM D5185m 1270 1253 1171 1439 Sulfur ppm ASTM D5185m 2060 3341 2928 3985 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.imm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.imm *AST	Molybdenum	ppm	ASTM D5185m	60	44	59	66
Calcium ppm ASTM D5185m 1070 1580 1054 1144 Phosphorus ppm ASTM D5185m 1150 925 973 1080 Zinc ppm ASTM D5185m 1270 1253 1171 1439 Sulfur ppm ASTM D5185m 2060 3341 2928 3985 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m 225 12 4 4 Sodium ppm ASTM D5185m >25 12 4 4 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/.mm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.imm *ASTM D7415	Manganese	ppm	ASTM D5185m	0	2	<1	<1
Phosphorus ppm ASTM D5185m 1150 925 973 1080 Zinc ppm ASTM D5185m 1270 1253 1171 1439 Sulfur ppm ASTM D5185m 2060 3341 2928 3985 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/ba	Magnesium	ppm	ASTM D5185m	1010	662	893	1029
Zinc ppm ASTM D5185m 1270 1253 1171 1439 Sulfur ppm ASTM D5185m 2060 3341 2928 3985 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.imm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.imm *ASTM D7414	Calcium	ppm	ASTM D5185m	1070	1580	1054	1144
Sulfur ppm ASTM D5185m 2060 3341 2928 3985 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >25 12 4 4 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.imm *ASTM D7624 >20 8.1 8.5 9.4 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.imm *ASTM D7414 >25 15.6 16.3 17.4	Phosphorus	ppm	ASTM D5185m	1150	925	973	1080
CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m<>25 12 4 4 Sodium ppm ASTM D5185m >25 12 4 4 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7615 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Zinc	ppm	ASTM D5185m	1270	1253	1171	1439
Silicon ppm ASTM D5185m >25 12 4 4 Sodium ppm ASTM D5185m >20 18 1 4 Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.im *ASTM D7615 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.im *ASTM D7414 >25 15.6 16.3 17.4	Sulfur	ppm	ASTM D5185m	2060	3341	2928	3985
Sodium ppm ASTM D5185m 18 1 4 Potassium ppm ASTM D5185m<>20 6 4 1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	CONTAMINA	NTS	method	limit/base	current	history1	history
Potassium ppm ASTM D5185m >20 6 4 1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Silicon	ppm	ASTM D5185m	>25	12	4	4
INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Sodium	ppm	ASTM D5185m		18	1	4
Soot % % *ASTM D7844 >4 0.4 0.5 0.6 Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Potassium	ppm	ASTM D5185m	>20	6	4	1
Nitration Abs/cm *ASTM D7624 >20 8.1 8.5 9.4 Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	INFRA-RED		method	limit/base	current	history1	history
Sulfation Abs/.1mm *ASTM D7415 >30 19.4 20.0 21.1 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Soot %	%	*ASTM D7844	>4	0.4	0.5	0.6
FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Nitration	Abs/cm	*ASTM D7624	>20	8.1	8.5	9.4
Oxidation Abs/.1mm *ASTM D7414 >25 15.6 16.3 17.4	Sulfation	Abs/.1mm		>30			21.1
	FLUID DEGRA	DATION	method	limit/base	current	history1	history
Base Number (BN) mg KOH/g ASTM D2896 9.8 8.5 7.6 6.1	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.6	16.3	17.4
	Base Number (BN)	mg KOH/q	ASTM D2896	9.8		7.6	6.1

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

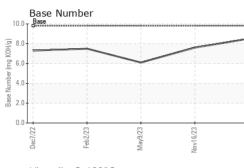
There is no indication of any contamination in the oil.

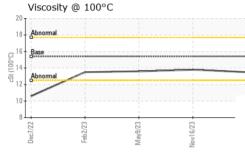
Fluid Condition

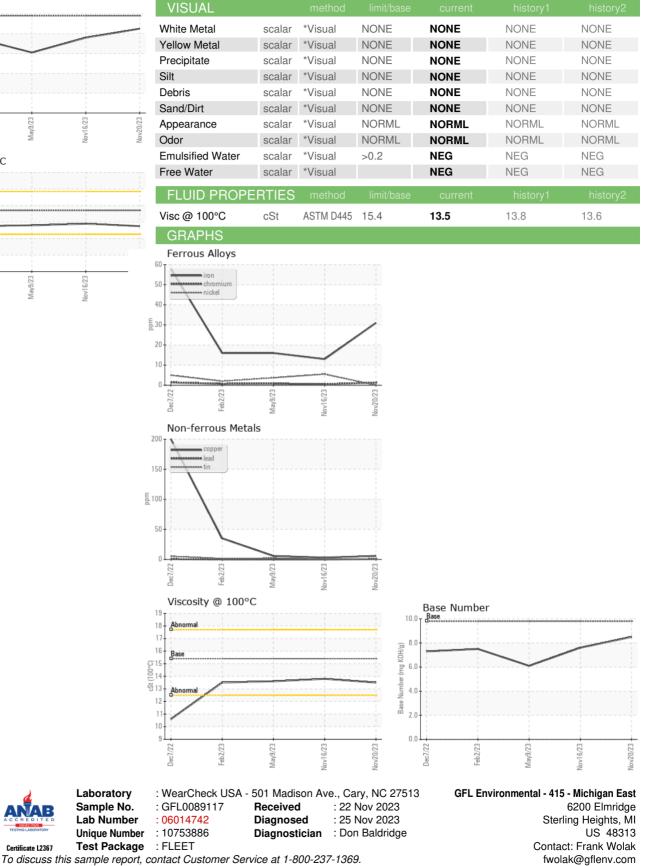
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



OIL ANALYSIS REPORT







* - 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: (586)825-9514

F:

Certificate L2367