

OIL ANALYSIS REPORT

Sample Rating Trend





Diesel Engine

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

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.

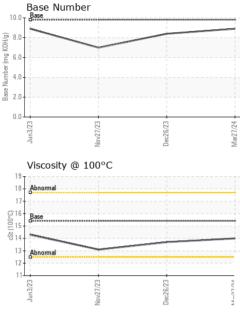
Fluid Condition

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

Sample Date Client Info 27 Mar 2024 26 Dec 2023 27 Nov 2023 Machine Age hrs Client Info 15920 15697 Oil Age hrs Client Info 15802 0 2600 Oil Changed Client Info Not Changd Changed Changed Changed Sample Status Imil/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Oron ppm ASTM D5185m >10 0 <1 Kron ppm ASTM D5185m >20 11 5 9 Chromium ppm ASTM D5185m >20 0 0 0 Silver ppm ASTM D5185m >20 4 3 3 Lead ppm ASTM D5185m >20 4 3 3 Lead ppm ASTM D5185m 0		MATION	method	limit/base	current	history1	history2
Machine Age Oil Age hrs Nrs Client Info 15920 15802 0 2600 Oil Age hrs Client Info 18802 0 2800 Oil Age Nrs Client Info Not Changed Changed Changed Sample Status Imit/base current NoRMAL NORMAL NORMAL CONTAMINATION method Imit/base current Nistory1 Nistory2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Mater WC Method >0.2 NEG NEG NEG Nickel ppm ASTM D5165m<>2 0 0 0 Nickel ppm ASTM D5165m >2 0 0 0 Auminum ppm ASTM D5165m >2 0 0 0 Auminum ppm ASTM D5165m >2 0 0 0 Vanadum	Sample Number		Client Info		GFL0117712	GFL0105825	GFL0089157
Oil Age hrs. Client Info 15802 0 2600 Oil Changed Client Info Not Changed Changed Changed Sample Status Imit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Glycol WC Method >3.0 <1.0 <1.0 <1.0 Wear WC Method >3.0 <1.0 <1.0 <1.0 Glycol WC Method >3.0 <1.0 <1.0 <1.0 Wear MC Method >3.0 <1.0 <1.0 <1.0 Silver MC Method >2.0 <1 0 <1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >20 4 3 3 Lead ppm ASTM D5185m >30 0 <1 2 Tin ppm ASTM D5185m 0 0 <td< th=""><th>Sample Date</th><th></th><th>Client Info</th><th></th><th>27 Mar 2024</th><th>26 Dec 2023</th><th>27 Nov 2023</th></td<>	Sample Date		Client Info		27 Mar 2024	26 Dec 2023	27 Nov 2023
Oil Changed Sample Status Client Info Not Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185m >12.0 11 5 9 Chromium ppm ASTM 05185m >2.0 <1 0 <1 Nickel ppm ASTM 05185m >2.0 0 0 0 Silver ppm ASTM 05185m >2.0 4 3 3 Lead ppm ASTM 05185m >2.0 4 3 3 Lead ppm ASTM 05185m >3.0 -1 2 1 Vanadium ppm ASTM 05185m >4 0 2 Cadmium ppm ASTM 05185m 0 4 0 2 Barium ppm ASTM 05185m<	Machine Age	hrs	Client Info		15920	15802	15697
Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG WEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 0 <1 Nickel ppm ASTM D5185m >20 <1 0 <1 Nickel ppm ASTM D5185m >20 4 3 3 <1 Lead ppm ASTM D5185m >20 4 3 3 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 1 0 0 0	Oil Age	hrs	Client Info		15802	0	2600
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 0 <1 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 4 3 3 Lead ppm ASTM D5185m >30 0 <1 2 1 Vanadium ppm ASTM D5185m >1 <1 <1 <1 Vanadium ppm ASTM D5185m 0 4 0 2	Oil Changed		Client Info		Not Changd	Changed	Changed
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Barium pm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 60 54 56 53 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 902 963 864 Calcium ppm ASTM D5185m 1010 902 963 864 Calcium ppm ASTM D5185m 1070 987 1101 948 Phosphorus ppm ASTM D5185m 1070 1200 1234 1163 Sulfur ppm ASTM D5185m 1270 1200 1234 1163 Sulfur ppm ASTM D5185m 2060 3475 3106 2557 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 7 <1 1 INFRA-RED method	ADDITIVES		method	limit/base	current	history1	history2
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Calcium ppm ASTM D5185m 1070 987 1101 948 Phosphorus ppm ASTM D5185m 1170 1010 1031 925 Zinc ppm ASTM D5185m 1270 1200 1234 1163 Sulfur ppm ASTM D5185m 2060 3475 3106 2557 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 7 <1 1 Potassium ppm ASTM D5185m >20 7 <1 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.7 0.2 0.3 Nitration Abs/cm *ASTM D7624 >20 6.1 5.7 8.0 Sulfation Abs/.1mm *ASTM D7415	Molybdenum	ppm	ASTM D5185m	60	54	56	53
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Sulfur ppm ASTM D5185m 2060 3475 3106 2557 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 7 <1	Manganese	ppm ppm	ASTM D5185m ASTM D5185m	0 1010	<1 902	0 963	<1 864
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m<>25 3 5 5 Sodium ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 7 <1 1 Potassium ppm ASTM D5185m >20 7 <1	Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070	<1 902 987	0 963 1101	<1 864 948
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Potassium ppm ASTM D5185m >20 7 <1	Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060	<1 902 987 1010 1200 3475	0 963 1101 1031 1234 3106	<1 864 948 925 1163 2557
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.7 0.2 0.3 Nitration Abs/cm *ASTM D7624 >20 6.1 5.7 8.0 Sulfation Abs/.1mm *ASTM D7415 >30 18.3 18.0 19.8	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	0 1010 1070 1150 1270 2060 Iimit/base	<1 902 987 1010 1200 3475 current	0 963 1101 1031 1234 3106 history1	<1 864 948 925 1163 2557 history2
Soot % % *ASTM D7844 >4 0.7 0.2 0.3 Nitration Abs/cm *ASTM D7624 >20 6.1 5.7 8.0 Sulfation Abs/.1mm *ASTM D7415 >30 18.3 18.0 19.8	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060 Iimit/base	<1 902 987 1010 1200 3475 current 3	0 963 1101 1031 1234 3106 history1 5	<1 864 948 925 1163 2557 history2 5
Nitration Abs/cm *ASTM D7624 >20 6.1 5.7 8.0 Sulfation Abs/.1mm *ASTM D7415 >30 18.3 18.0 19.8	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060 limit/base >25	<1 902 987 1010 1200 3475 <u>current</u> 3 10	0 963 1101 1031 1234 3106 history1 5 1	<1 864 948 925 1163 2557 history2 5 4
Sulfation Abs/.1mm *ASTM D7415 >30 18.3 18.0 19.8	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060 limit/base >25 >20	<1 902 987 1010 1200 3475 <u>current</u> 3 10 7	0 963 1101 1031 1234 3106 history1 5 1 <1	<1 864 948 925 1163 2557 history2 5 4 1
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FLUID DEGRADATION method limit/base current history1 history2	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >4	<1 902 987 1010 1200 3475 current 3 10 7 current 0.7	0 963 1101 1031 1234 3106 history1 5 1 <1 <1 history1 0.2	<1 864 948 925 1163 2557 history2 5 4 1 history2 0.3
	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	0 1010 1070 1150 1270 2060 <i>limit/base</i> >25 >20 <i>limit/base</i> >4 >20	<1 902 987 1010 1200 3475 <u>current</u> 3 10 7 <u>current</u> 0.7 6.1	0 963 1101 1031 1234 3106 history1 5 1 <1 <1 history1 0.2 5.7	<1 864 948 925 1163 2557 history2 5 4 1 history2 0.3 8.0
Oxidation Abs/.1mm *ASTM D7414 >25 13.7 13.7 15.6	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	0 1010 1070 1150 1270 2060 imit/base >25 >20 imit/base >4 >20 >4 >20	<1 902 987 1010 1200 3475 <u>current</u> 3 10 7 <u>current</u> 0.7 6.1 18.3	0 963 1101 1031 1234 3106 history1 5 1 <1 <1 history1 0.2 5.7 18.0	<1 864 948 925 1163 2557 history2 5 4 1 history2 0.3 8.0 19.8
Base Number (BN) mg KOH/g ASTM D2896 9.8 8.9 8.4 7.0	Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7624 *ASTM D7415	0 1010 1070 1150 1270 2060 imit/base >25 >20 imit/base >4 >20 >30 imit/base	<1 902 987 1010 1200 3475 current 3 10 7 current 0.7 6.1 18.3 current	0 963 1101 1031 1234 3106 history1 5 1 <1 <1 history1 0.2 5.7 18.0 history1	<1 864 948 925 1163 2557 history2 5 4 1 history2 0.3 8.0 19.8 history2



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		
Dec26/23	Mar27/24	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML		
Dec	Ma	Odor	scalar	*Visual	NORML	NORML	NORML	NORML		
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG		
		Free Water	scalar	*Visual		NEG	NEG	NEG		
		FLUID PROF		method	limit/base	current	history1	history2		
	*******************	Visc @ 100°C	cSt	ASTM D445	15.4	14.0	13.7	13.1		
		GRAPHS								
		Ferrous Alloys								
Dec26/23	V CI CC	50 - historica chromium								
Dei	14	40-								
		<u>ڦ</u> 30								
		20								
		10	_							
					4					
		Jun3/23 Vov27/23		Dec26/23	Mar27/24					
		2		De	M					
		Non-ferrous Me	etals							
		copper								
		8 -								
		6 -								
		udd								
		4								
		2								
		333		23	24					
		Jun3/23 Nov27/23		Dec26/23	Mar27/24					
		Viscosity @ 100)°C			Base Number				
		18 - Abnormal			10.0	Base				
		17			_@ 8.0					
		G ¹⁶ Bare								
		()16 Base 15 15 14		*****	er (m					
		83 ₁₄		1	1.8 1.0 8 8 9 1.9 8 9 1.0 8 9 1.0 8 9 1.0 9 1.0 9 1.0 1.0 9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	0				
		13 Abnormal			ase 2.0					
		12-			2.1					
		11		/23			//73	//23		
		Jun3/23 Nov27/23		Dec26/23	Mar27/24	Jun3/23	Nov21/23	Dec26/23		
	Laboratory	: WearCheck USA - 501 Madison Ave., Cary, NC 27513 GFL Environmental - 41								
<u> </u>	Sample No.	: GFL0117712	Rece	Received : 29 Mar 2024				6200 Elmridg		
MAR		. 00100004	Teste	d : 31	Mar 2024	Sterling Heights, N				
	Lab Number									
	Lab Number Unique Number Test Package	: 10952469			Mar 2024 - W	les Davis		US 483 tot: Frank Wol		

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

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