

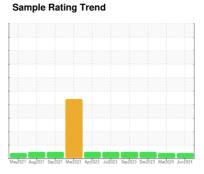
OIL ANALYSIS REPORT



Machine Id **422026-402278**

Diesel Engine

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





DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

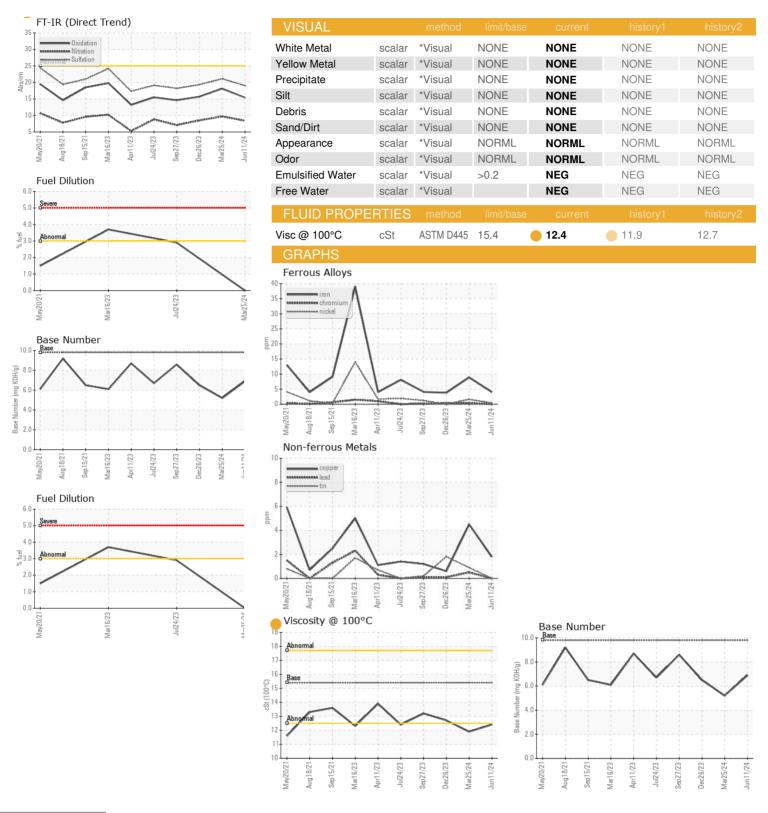
Fluid Condition

The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

SAMPLE INFORMATION method limit/base current history1 history2	N SHP 15W40 (-						
Client Info	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		GFL0106042	GFL0106202	GFL0106100
Machine Age hrs Client Info 7984 7438 6982 Oil Age hrs Client Info 600 456 600 Oil Changed Client Info Changed ATTENTION NORMAL CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method limit/base current history1 history2 Iron ppm ASTM D5185m >120 4 9 4 Chromium ppm ASTM D5185m >20 0 <1			Client Info		11 Jun 2024	25 Mar 2024	26 Dec 2023
Client Info		hrs	Client Info		7984	7438	6982
ATTENTION NORMAL	Oil Age	hrs	Client Info		600	456	600
CONTAMINATION method limit/base current history1 history2 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 >120 4 9 4 Chromium ppm ASTM D5185m >20 0 <1	Oil Changed		Client Info		Changed	Changed	Changed
Water WC Method >0.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 4 9 4 Chromium ppm ASTM D5185m >20 0 <1 <1 Nickel ppm ASTM D5185m >20 0 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >20 2 4 2 Lead ppm ASTM D5185m >30 0 <1 <1 <1 Copper ppm ASTM D5185m >30 2 4 <1 <1 Tin ppm ASTM D5185m >15 0 <1 2 Vanadium ppm ASTM D5185m 0	Sample Status				ATTENTION	ATTENTION	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 4 9 4 Chromium ppm ASTM D5185m >20 0 -1 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	4	9	4
Titanium	Chromium	ppm	ASTM D5185m	>20	0	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>5	<1	2	0
Aluminum	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Lead	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 2 4 <1 Tin ppm ASTM D5185m >15 0 <1	Aluminum	ppm	ASTM D5185m	>20	2	4	2
Vanadium	Lead	ppm	ASTM D5185m	>40	0	<1	<1
Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 1 4 Barium ppm ASTM D5185m 0 0 <1 0 Molybdenum ppm ASTM D5185m 0 0 <1 0 Molybdenum ppm ASTM D5185m 0 <1 <1 0 Molybdenum ppm ASTM D5185m 0 <1 <1 0 Manganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 1010 868 851 911 Calcium ppm ASTM D5185m 1070 1119 1070 1013 Phosphorus ppm ASTM D5185m 1270 1205 1140	Copper	ppm	ASTM D5185m	>330	2	4	<1
Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 1 4 Barium ppm ASTM D5185m 0 0 <1 0 Molybdenum ppm ASTM D5185m 60 60 59 56 Manganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 1010 868 851 911 Calcium ppm ASTM D5185m 1070 1119 1070 1013 Phosphorus ppm ASTM D5185m 1070 1149 920 1019 Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m >2060 3523 2860 3181 CONTAMINANTS method limit/base current	Tin	ppm	ASTM D5185m	>15	0	<1	2
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 1 4 Barium ppm ASTM D5185m 0 0 <1	Vanadium	ppm	ASTM D5185m		0	<1	0
Boron	Cadmium	ppm	ASTM D5185m		0	<1	0
Barium ppm ASTM D5185m 0 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 60 59 56 Manganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 1010 868 851 911 Calcium ppm ASTM D5185m 1070 1119 1070 1013 Phosphorus ppm ASTM D5185m 1150 1049 920 1019 Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m >20 2 2 <1	Boron	ppm	ASTM D5185m	0	8	1	4
Manganese ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 1010 868 851 911 Calcium ppm ASTM D5185m 1070 1119 1070 1013 Phosphorus ppm ASTM D5185m 1150 1049 920 1019 Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m >20 2 2 <1	Barium	ppm	ASTM D5185m	0	0	<1	0
Magnesium ppm ASTM D5185m 1010 868 851 911 Calcium ppm ASTM D5185m 1070 1119 1070 1013 Phosphorus ppm ASTM D5185m 1150 1049 920 1019 Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m >20 2 2 <1	Molybdenum	maa	ASTM D5185m	60	60	59	56
Calcium ppm ASTM D5185m 1070 1119 1070 1013 Phosphorus ppm ASTM D5185m 1150 1049 920 1019 Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m >20 2 2 <1		1-1-					
Phosphorus ppm ASTM D5185m 1150 1049 920 1019 Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m >20 2 2 <1	Manganese		ASTM D5185m	0	<1	<1	0
Zinc ppm ASTM D5185m 1270 1205 1140 1265 Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m 20 2 2 <1	•	ppm					
Sulfur ppm ASTM D5185m 2060 3523 2860 3181 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m 4 6 <1	Magnesium	ppm	ASTM D5185m	1010	868	851	911
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m 4 6 <1	Magnesium Calcium	ppm ppm	ASTM D5185m ASTM D5185m	1010 1070	868 1119	851 1070	911 1013
Silicon ppm ASTM D5185m >25 4 5 3 Sodium ppm ASTM D5185m 4 6 <1 Potassium ppm ASTM D5185m >20 2 2 <1 Fuel % ASTM D3524 >3.0 <1.0 0.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.4 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	1010 1070 1150	868 1119 1049	851 1070 920	911 1013 1019
Sodium ppm ASTM D5185m 4 6 <1 Potassium ppm ASTM D5185m >20 2 2 <1	Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1010 1070 1150 1270	868 1119 1049 1205	851 1070 920 1140	911 1013 1019 1265
Potassium ppm ASTM D5185m >20 2 2 <1 Fuel % ASTM D3524 >3.0 <1.0 0.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.4 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1010 1070 1150 1270 2060	868 1119 1049 1205 3523	851 1070 920 1140 2860	911 1013 1019 1265 3181
Fuel % ASTM D3524 >3.0 <1.0 0.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.4 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	1010 1070 1150 1270 2060	868 1119 1049 1205 3523 current	851 1070 920 1140 2860 history1	911 1013 1019 1265 3181 history2
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.4 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	1010 1070 1150 1270 2060	868 1119 1049 1205 3523 current	851 1070 920 1140 2860 history1	911 1013 1019 1265 3181 history2
Soot % % *ASTM D7844 >4 0.2 0.4 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	1010 1070 1150 1270 2060 limit/base >25	868 1119 1049 1205 3523 current 4	851 1070 920 1140 2860 history1 5	911 1013 1019 1265 3181 history2 3
Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1010 1070 1150 1270 2060 limit/base >25	868 1119 1049 1205 3523 current 4 4	851 1070 920 1140 2860 history1 5 6	911 1013 1019 1265 3181 history2 3 <1 <1
Nitration Abs/cm *ASTM D7624 >20 8.4 9.7 8.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	868 1119 1049 1205 3523 current 4 4 2 <1.0	851 1070 920 1140 2860 history1 5 6 2 0.0	911 1013 1019 1265 3181 history2 3 <1 <1
Sulfation Abs/.1mm *ASTM D7415 >30 19.0 21.1 19.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.4 18.1 15.7	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	868 1119 1049 1205 3523	851 1070 920 1140 2860 history1 5 6 2 0.0	911 1013 1019 1265 3181 history2 3 <1 <1 <1.0
Oxidation	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 method *ASTM D7844	1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base	868 1119 1049 1205 3523	851 1070 920 1140 2860 history1 5 6 2 0.0 history1 0.4	911 1013 1019 1265 3181 history2 3 <1 <1 <1.0 history2
	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7624	1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base	868 1119 1049 1205 3523	851 1070 920 1140 2860 history1 5 6 2 0.0 history1 0.4 9.7	911 1013 1019 1265 3181 history2 3 <1 <1 <1.0 history2 0.3 8.5
	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D76145	1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >4 >20 >30	868 1119 1049 1205 3523 current 4 4 2 <1.0 current 0.2 8.4 19.0	851 1070 920 1140 2860 history1 5 6 2 0.0 history1 0.4 9.7 21.1	911 1013 1019 1265 3181 history2 3 <1 <1 <1.0 history2 0.3 8.5 19.3
	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAI	ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D7824 *ASTM D7844 *ASTM D7624 *ASTM D7415 method	1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >4 >20 >30 limit/base	868 1119 1049 1205 3523	851 1070 920 1140 2860 history1 5 6 2 0.0 history1 0.4 9.7 21.1 history1	911 1013 1019 1265 3181 history2 3 <1 <1 <1.0 history2 0.3 8.5 19.3 history2



OIL ANALYSIS REPORT







Certificate 12367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No.

: GFL0106042 Lab Number : 06212860

Unique Number : 11085724 Test Package : FLEET (Additional Tests: FuelDilution, PercentFuel)

Received **Tested** Diagnosed

: 17 Jun 2024 : 19 Jun 2024

: 19 Jun 2024 - Angela Borella

Jacksonville, FL US 32256 Contact: GRANVILLE CARROLL gcarroll@gflenv.com

7580 PHILIPS HWY

T: 1(904)252-6815

GFL Environmental - 152 - Jacksonville

To discuss this sample report, contact Customer Service at 1-800-237-1369. st - 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)

Submitted By: WITH iNDIANA GFL - Chris Smith