

OIL ANALYSIS REPORT

NDT









(YA139885) Machine Id 2464 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (60 GAL)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor. No other corrective action is recommended at this time.

Wear

All component wear rates are normal.

Contamination

Light fuel dilution occurring. No other contaminants were detected in the oil.

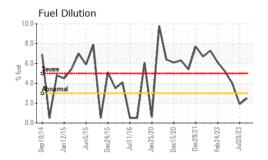
Fluid Condition

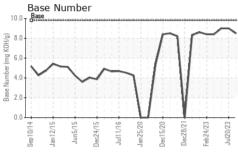
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

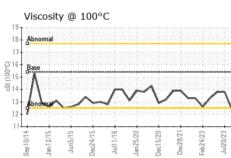
Sample Date Client Info 03 Feb 2024 20 Jul 2023 04 Jul 2023 Machine Age hrs Client Info 43350 617178 617178 Oil Age hrs Client Info 600 617178 617178 Oil Changed Client Info Changed Changed Changed	N SHP 15W40 (6	0 GAL)	p2014 Jan201	5 Jun2015 Dec2015 Jul2010	6 Jan2020 Dec2020 Dec2021 Feb2	023 Jul2023	
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 43350 617178 617178 617178 Oil Age hrs Client Info 600 617178 617178 617178 Oil Changed Client Info Changed Changed Changed Changed Changed Changed Changed Changed Changed Changed NEG ABNORMAL VORTHAMINATION method limit/base current history1 history2 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185n >20 <1	Sample Number		Client Info		GFL0090001	GFL0080552	GFL0066868
Oil Age hrs Client Info 600 617178 617178 Oil Changed Chang	Sample Date		Client Info		03 Feb 2024	20 Jul 2023	04 Jul 2023
Oil Changed Sample Status Client Info Changed NORMAL Changed NORMAL Changed ABNORMAL ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 12 4 14 14 Chromium ppm ASTM D5185m >20 <1	Machine Age	hrs	Client Info		43350	617178	617178
NORMAL NORMAL ABNORMAL CONTAMINATION method imit/base current history1 history2 history2	Oil Age	hrs	Client Info		600	617178	617178
Water	Oil Changed		Client Info		Changed	Changed	Changed
Water Glycol WC Method WC Method >0.2 NEG NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 12 4 14 Chromium ppm ASTM D5185m >20 <1	Sample Status				NORMAL	NORMAL	ABNORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Irron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1 <1 1 Nickel ppm ASTM D5185m >5 0 0 0 Titanium ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m >2 <1 0 0 Lead ppm ASTM D5185m >40 <1 0 2 Copper ppm ASTM D5185m >40 <1 0 2 Copper ppm ASTM D5185m >330 <1 0 2 Cadadium ppm ASTM D5185m 0 0 0 0 0 ADDTIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 6 3 Barium ppm ASTM D5185m 0 12	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	12	4	14
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	<1	1
Silver	Nickel	ppm	ASTM D5185m	>5	0	0	0
Aluminum	Titanium	ppm	ASTM D5185m	>2	<1	0	0
Lead ppm ASTM D5185m >40 <1 0 2 Copper ppm ASTM D5185m >330 <1 0 2 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 6 3 Boron ppm ASTM D5185m 0 12 0 0 Boron ppm ASTM D5185m 0 12 0 0 Barium ppm ASTM D5185m 0 12 0 0 Molybdenum ppm ASTM D5185m 0 12 0 0 Magnesium ppm ASTM D5185m 1010 757 992 944 Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1270 1008 131	Silver	ppm	ASTM D5185m	>2	<1	0	0
Copper ppm ASTM D5185m >330 <1 0 2 Tin ppm ASTM D5185m >15 0 0 <1	Aluminum	ppm	ASTM D5185m	>20	2	<1	0
Trin	Lead	ppm	ASTM D5185m	>40	<1	0	2
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 0 6 3 Barium ppm ASTM D5185m 0 12 0 0 Molybdenum ppm ASTM D5185m 60 50 60 59 Manganese ppm ASTM D5185m 0 0 0 <1 Magnesium ppm ASTM D5185m 1010 757 992 944 Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1<	Copper	ppm	ASTM D5185m	>330	<1	0	2
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 6 3 Barium ppm ASTM D5185m 0 12 0 0 Molybdenum ppm ASTM D5185m 60 50 60 59 Manganese ppm ASTM D5185m 0 0 0 <1 Magnesium ppm ASTM D5185m 1010 757 992 944 Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current	Tin	ppm	ASTM D5185m	>15	0	0	<1
ADDITIVES	Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 0 6 3 Barium ppm ASTM D5185m 0 12 0 0 Molybdenum ppm ASTM D5185m 60 50 60 59 Manganese ppm ASTM D5185m 1010 757 992 944 Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1150 915 1098 1032 Zinc ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 3 Sodium ppm ASTM D5185m >20 1 <1 3 Fuel % ASTM D3524 >3.0 2.5 1.9 ▲ 4.0 INFRA-RED method limit/base current history1 history2 Sout % % "ASTM D7844 >4 1.8 0.4 2.1 Nitration Abs/cm "ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Coxidation Abs/.1mm "ASTM D7415 >30 20.2 17.6 22.5	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 12 0 0 Molybdenum ppm ASTM D5185m 60 50 60 59 Manganese ppm ASTM D5185m 0 0 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 50 60 59 Manganese ppm ASTM D5185m 0 0 0 <1	Boron	ppm	ASTM D5185m	0	0	6	3
Manganese ppm ASTM D5185m 0 0 <1 Magnesium ppm ASTM D5185m 1010 757 992 944 Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1150 915 1098 1032 Zinc ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m >20 1 <1	Barium	ppm	ASTM D5185m	0	12	0	0
Magnesium ppm ASTM D5185m 1010 757 992 944 Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1150 915 1098 1032 Zinc ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m >20 1 <1	Molybdenum	ppm			50	60	59
Calcium ppm ASTM D5185m 1070 883 1138 1040 Phosphorus ppm ASTM D5185m 1150 915 1098 1032 Zinc ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m >20 1 <1	Manganese	ppm	ASTM D5185m	0	0		<1
Phosphorus ppm ASTM D5185m 1150 915 1098 1032 Zinc ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m >20 1 <1	Magnesium	ppm	ASTM D5185m	1010	757	992	
Zinc ppm ASTM D5185m 1270 1008 1310 1257 Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m >20 1 <1	Calcium	ppm	ASTM D5185m	1070	883	1138	1040
Sulfur ppm ASTM D5185m 2060 2913 3936 3661 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m 0 2 <1	Phosphorus	ppm	ASTM D5185m	1150	915	1098	1032
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m 0 2 <1	Zinc	ppm	ASTM D5185m	1270	1008	1310	1257
Silicon ppm ASTM D5185m >25 2 3 3 Sodium ppm ASTM D5185m 0 2 <1 Potassium ppm ASTM D5185m >20 1 <1 3 Fuel % ASTM D3524 >3.0 2.5 1.9 ▲ 4.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 1.8 0.4 2.1 Nitration Abs/cm *ASTM D7624 >20 7.9 4.9 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Sulfur	ppm	ASTM D5185m	2060	2913	3936	3661
Sodium ppm ASTM D5185m 0 2 <1 Potassium ppm ASTM D5185m >20 1 <1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 1 <1 3 Fuel % ASTM D3524 >3.0 2.5 1.9 ▲ 4.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 1.8 0.4 2.1 Nitration Abs/cm *ASTM D7624 >20 7.9 4.9 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Silicon	ppm	ASTM D5185m	>25	2	3	3
Fuel % ASTM D3524 >3.0 2.5 1.9 ▲ 4.0 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 >4 1.8 0.4 2.1 Nitration Abs/cm *ASTM D7624 >20 7.9 4.9 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Sodium	ppm	ASTM D5185m		0	2	<1
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 1.8 0.4 2.1 Nitration Abs/cm *ASTM D7624 >20 7.9 4.9 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Potassium	ppm	ASTM D5185m	>20	1	<1	3
Soot % % *ASTM D7844 >4 1.8 0.4 2.1 Nitration Abs/cm *ASTM D7624 >20 7.9 4.9 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Fuel	%	ASTM D3524	>3.0	2.5	1.9	▲ 4.0
Nitration Abs/cm *ASTM D7624 >20 7.9 4.9 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 20.2 17.6 22.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Soot %	%	*ASTM D7844	>4	1.8	0.4	2.1
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Nitration	Abs/cm	*ASTM D7624	>20	7.9	4.9	7.8
Oxidation Abs/.1mm *ASTM D7414 >25 13.6 12.7 15.3	Sulfation	Abs/.1mm	*ASTM D7415	>30	20.2	17.6	22.5
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 8.5 9.0 9.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.6	12.7	15.3

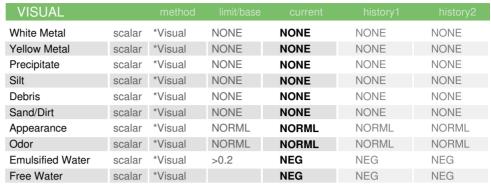


OIL ANALYSIS REPORT



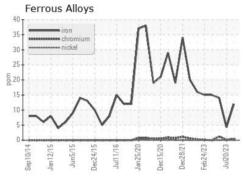


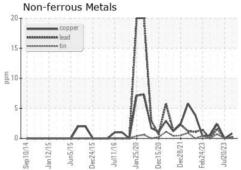


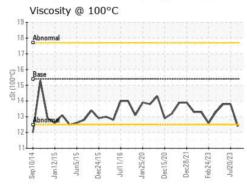


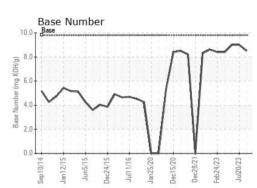
FLUID PROPI	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	15.4	12.4	13.8	13.8

GRAPHS













Certificate L2367

Laboratory Sample No. Lab Number : 06088565

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0090001

Unique Number : 10876010

Received **Tested**

Diagnosed Test Package: FLEET (Additional Tests: FuelDilution, PercentFuel)

: 15 Feb 2024 : 15 Feb 2024 - Wes Davis

: 14 Feb 2024

4621 Marracco Drive Hope Mills, NC US 28348 Contact: Robert Carter

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

robert.carter@gflenv.com T: (910)596-1170

GFL Environmental - 018 - Fayetteville

* - 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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