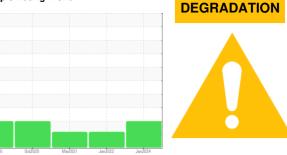


OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id OR638

Component Front Differential

PETRO CANADA ENDURATEX EP 220 (30 LTR)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. The fluid was specified as PETRO CANADA ENDURATEX EP 220, however, a fluid match indicates that this fluid is SAE 80W140 Gear Oil. Please confirm the oil type and grade on your next sample.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

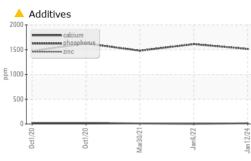
Fluid Condition

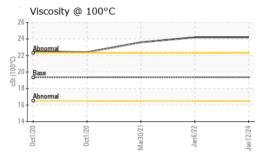
The AN level is above the recommended limit. Additive levels indicate the addition of a different brand, or type of oil. The oil is no longer serviceable.

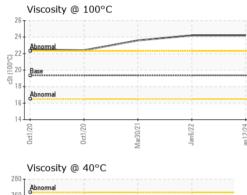
Machine Age hrs Client Info 18127 15633 14658 Oil Age hrs Client Info 500 1100 0 Oil Changed Client Info ABNORMAL ATTENTION ATTENTION CONTAMINATION method limitbase current history1 history2 Water WC Method >.2 NEG NEG NEG Wethon ppm ASTM DB184 Current history1 history2 PQ ASTM DB184 31 Iron ppm ASTM DB184 31 Iron ppm ASTM DB185(m) >100 145 153 Chromium ppm ASTM DB185(m) >10 <1 -1 Iran ppm ASTM DB185(m) >25 0 0 0 Silver ppm ASTM DB185(m) >25 0 0 0 Auminum ppm ASTM DB185(m) >50 <th>SAMPLE INFORM</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFORM		method	limit/base	current	history1	history2
Machine Age hrs Client Info 18127 15633 14658 Oil Age hrs Client Info 500 1100 0 Oil Changed Client Info ABNORMAL ATTENTION ATTENTION CONTAMINATION method limit/base current history1 history2 Water WC Method >.2 NEG NEG NEG Wear wC Method >.2 NEG NEG NEG PQ ASTM D6184/ 31 Iron ppm ASTM D6185(m) >100 145 153 Chromium ppm ASTM D6185(m) >10 <1	Sample Number		Client Info		PC0080576	PC0058836	PC0047564
Oil Age hrs Client Info 500 1100 0 Oil Changed Client Info Changed Changed Changed Sample Status Imaged ABNORMAL ATTENTION ATTENTION CONTAMINATION method limit/base current history1 history2 Water WC Method >.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D6184/* 31 Iron ppm ASTM D6185(m) >500 102 145 153 Chromium ppm ASTM D6185(m) >10 <1	Sample Date		Client Info		12 Jan 2024	06 Jan 2022	30 Mar 2021
Oli Changed Client Info Changed Changed Changed Changed ATTENTION Sample Status Imaged Imit base current history1 history2 Water WC Method >.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D8184' 31 Iron ppm ASTM D5185(m) >500 102 145 153 Chronnium ppm ASTM D5185(m) >100 41 -1 -1 Nickel ppm ASTM D5185(m) >100 -1 -1 -1 Nickel ppm ASTM D5185(m) >25 <1	Machine Age	hrs	Client Info		18127	15633	14658
Oli Changed Client Info Changed Changed Changed Changed ATTENTION Sample Status Imaged Imit base current history1 history2 Water WC Method >.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D8184' 31 Iron ppm ASTM D5185(m) >500 102 145 153 Chronnium ppm ASTM D5185(m) >100 41 -1 -1 Nickel ppm ASTM D5185(m) >100 -1 -1 -1 Nickel ppm ASTM D5185(m) >25 <1	Oil Age	hrs	Client Info		500	1100	0
Sample Status Imathematical Status ABNORMAL ATTENTION ATTENTION CONTAMINATION method limit/base current history1 history2 Water WC Method >.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D8184* 31 Iron ppm ASTM D8184* 31 Iron ppm ASTM D8185(m) >100 145 153 Chromium ppm ASTM D8185(m) >10 <1			Client Info		Changed	Changed	Changed
Water WC Method >.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D6184* 31 Iron ppm ASTM D6185m >500 102 145 153 Chromium ppm ASTM D5185m >10 <1	Sample Status				ABNORMAL	ATTENTION	ATTENTION
WEAR METALS method limit/base current history1 history2 PQ ASTM D6184* 31 Iron ppm ASTM D6184* 31 Iron ppm ASTM D5185(m) >500 102 145 153 Chromium ppm ASTM D5185(m) 0 -<1 <1 -<1 Titanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) >25 0 0 0 Copper ppm ASTM D5185(m) >25 0 0 0 Copper ppm ASTM D5185(m) >10 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 33 33 33	CONTAMINATI	ION	method	limit/base	current	history1	history2
PQ ASTM D8184* 31 Iron ppm ASTM D8184 31 Iron ppm ASTM D5185(m) >500 102 145 153 Chromium ppm ASTM D5185(m) >10 <1 <1 <1 Titanium ppm ASTM D5185(m) >20 0 0 0 Silver ppm ASTM D5185(m) >25 0 0 0 Aluminum ppm ASTM D5185(m) >25 0 0 0 Copper ppm ASTM D5185(m) >25 0 0 0 Charadium ppm ASTM D5185(m) >10 0 0 0 Bervillium ppm ASTM D5185(m) 5 0 0 0 Addminum ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 41 1 2	Water		WC Method	>.2	NEG	NEG	NEG
Iron ppm ASTM D5185(m) >500 102 145 153 Chromium ppm ASTM D5185(m) >10 3 4 3 Nickel ppm ASTM D5185(m) >10 <1 <1 <1 Tittanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) >25 <1 <1 <1 <1 Aluminum ppm ASTM D5185(m) >25 0 0 0 0 Copper ppm ASTM D5185(m) >100 1 2 <1 1 Lead ppm ASTM D5185(m) >10 0 0 0 0 Copper ppm ASTM D5185(m) >5 0 0 0 0 0 Cadmium ppm ASTM D5185(m) >5 0 0 0 0 0 0 0 0 0 0 0 0 0	WEAR METALS	S	method	limit/base	current	history1	history2
Chromium ppm ASTM D5185(m) >10 3 4 3 Nickel ppm ASTM D5185(m) >10 <1 <1 <1 Titanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) >25 <1 <1 <1 Aluminum ppm ASTM D5185(m) >25 0 0 0 Copper ppm ASTM D5185(m) >25 0 0 0 Copper ppm ASTM D5185(m) >100 1 2 <1 Tin ppm ASTM D5185(m) >10 0 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 0 ADDITIVES method Imit/base current history1 history2 Boron ppm ASTM D518	PQ		ASTM D8184*		31		
Nickel ppm ASTM D5185(m) >10 <1 <1 <1 <1 Titanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) >25 <1	Iron	ppm	ASTM D5185(m)	>500	102	145	153
Titanium ppm ASTM D5185(m) 0 0 0 Silver ppm ASTM D5185(m) >25 <1 <1 <1 Aluminum ppm ASTM D5185(m) >255 0 0 0 Lead ppm ASTM D5185(m) >255 0 0 0 Copper ppm ASTM D5185(m) >100 1 2 <1 Tin ppm ASTM D5185(m) >100 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 Boron ppm ASTM D5185(m) 0 0 0 0 0 Magnesium ppm ASTM D5185(m) 0 31 41 25 Magnesium ppm ASTM D5185(m) 0 41	Chromium	ppm	ASTM D5185(m)	>10	3	4	3
Silver ppm ASTM D5185(m) 0 <1 <1 Aluminum ppm ASTM D5185(m) >25 <1	Nickel	ppm	ASTM D5185(m)	>10	<1	<1	<1
Aluminum ppm ASTM D5185(m) >25 <1	Titanium	ppm	ASTM D5185(m)		0	0	0
Lead ppm ASTM D5185(m) >25 0 0 0 Copper ppm ASTM D5185(m) >100 1 2 <1	Silver	ppm	ASTM D5185(m)		0	<1	<1
Copper ppm ASTM D5185(m) >100 1 2 <1 Tin ppm ASTM D5185(m) >10 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 <1	Aluminum	ppm	ASTM D5185(m)	>25	<1	<1	<1
Tin ppm ASTM D5185(m) >10 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 8 211 ▲ 255 Magnesium ppm ASTM D5185(m) 0 <1	Lead	ppm	ASTM D5185(m)	>25	0	0	0
Antimony ppm ASTM D5185(m) >5 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 60 32 34 33 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 <1	Copper	ppm	ASTM D5185(m)	>100	1	2	<1
Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 60 32 34 33 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 8 21 25 Manganese ppm ASTM D5185(m) 0 <11	Tin	ppm	ASTM D5185(m)	>10	0	0	0
Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 60 32 34 33 Barium ppm ASTM D5185(m) 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 8 21 25 Manganese ppm ASTM D5185(m) 0 <11 2 Magnesium ppm ASTM D5185(m) 0 <11 <1 2 Calcium ppm ASTM D5185(m) 0 <14 4 11 Phosphorus ppm ASTM D5185(m) 0 <14 4 11 Sulfur ppm ASTM D5185(m) 270 1514 4617 4911 Lithium ppm ASTM D5185(m) 270 4803	Antimony	ppm	ASTM D5185(m)	>5	0	0	0
CadmiumppmASTM D5185(m)000ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m)60323433BariumppmASTM D5185(m)0000MolybdenumppmASTM D5185(m)082125ManganeseppmASTM D5185(m)0<1	Vanadium	ppm	ASTM D5185(m)		0	0	0
CadmiumppmASTM D5185(m)000ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m)60323433BariumppmASTM D5185(m)0000MolybdenumppmASTM D5185(m)082125ManganeseppmASTM D5185(m)0<1	Beryllium	ppm	ASTM D5185(m)		0	0	0
Boron ppm ASTM D5185(m) 60 32 34 33 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 8 21 25 Manganese ppm ASTM D5185(m) 0 <1		ppm	ASTM D5185(m)		0	0	0
Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 8 21 25 Manganese ppm ASTM D5185(m) 0 <1 1 2 Magnesium ppm ASTM D5185(m) 0 <1 1 2 Magnesium ppm ASTM D5185(m) 0 <1 <1 <1 Calcium ppm ASTM D5185(m) 0 14 4 11 Phosphorus ppm ASTM D5185(m) 270 ▲ 1514 ▲ 1612 ▲ 1479 Zinc ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 11200 ▲ 4803 ▲ 4617 ▲ 4911 Lithium ppm ASTM D5185(m) 11200 ▲ 4803 ▲ 66 1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >75 8 8 6 Sodium ppm AS	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185(m) 0 8 21 25 Manganese ppm ASTM D5185(m) 0 <1 2 Magnesium ppm ASTM D5185(m) 0 <1 1 2 Calcium ppm ASTM D5185(m) 0 <1 <1 2 Calcium ppm ASTM D5185(m) 0 <14 4 11 Phosphorus ppm ASTM D5185(m) 0 144 4 111 Phosphorus ppm ASTM D5185(m) 270 1514 1612 1479 Zinc ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 0 9 6 11 Lithium ppm ASTM D5185(m) 11200 4803 4617 4911 Lithium ppm ASTM D5185(m) < 4803 4617 4911 Solicon ppm ASTM D5185(m) >75 8 8 6 Sodium ppm ASTM D5185(m) >20 <td>Boron</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>60</td> <th>32</th> <td>34</td> <td>33</td>	Boron	ppm	ASTM D5185(m)	60	32	34	33
Manganese ppm ASTM D5185(m) 0 <1 1 2 Magnesium ppm ASTM D5185(m) 0 <1 <1 <1 <1 Calcium ppm ASTM D5185(m) 0 14 4 11 Phosphorus ppm ASTM D5185(m) 0 14 4 111 Phosphorus ppm ASTM D5185(m) 0 9 6 11 Zinc ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 11200 4803 4617 4911 Lithium ppm ASTM D5185(m)	Barium	ppm	ASTM D5185(m)	0	0	0	0
Magnesium ppm ASTM D5185(m) 0 <1	Molybdenum	ppm	ASTM D5185(m)	0	8	1 21	1 25
Magnesium ppm ASTM D5185(m) 0 <1 <1 <1 Calcium ppm ASTM D5185(m) 0 14 4 11 Phosphorus ppm ASTM D5185(m) 270 1514 1612 1479 Zinc ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 11200 4803 4617 4911 Lithium ppm ASTM D5185(m) 11200 4803 4617 4911 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >75 8 8 6 Sodium ppm ASTM D5185(m) >20 1 <1	Manganese	ppm	ASTM D5185(m)	0	<1	1	2
Calcium ppm ASTM D5185(m) 0 14 4 11 Phosphorus ppm ASTM D5185(m) 270 ▲ 1514 1612 1479 Zinc ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 11200 ▲ 4803 ▲ 4617 ▲ 4911 Lithium ppm ASTM D5185(m) 11200 ▲ 4803 ▲ 4617 ▲ 4911 Lithium ppm ASTM D5185(m) 11200 ▲ 4803 ▲ 4617 ▲ 4911 Lithium ppm ASTM D5185(m)	Magnesium	ppm	ASTM D5185(m)	0	<1	<1	<1
Zinc ppm ASTM D5185(m) 0 9 6 11 Sulfur ppm ASTM D5185(m) 11200 4803 4617 4911 Lithium ppm ASTM D5185(m) 11200 4803 4617 4911 Lithium ppm ASTM D5185(m) -1 <1	-	ppm	ASTM D5185(m)	0	14	4	11
ZincppmASTM D5185(m)09611SulfurppmASTM D5185(m)11200480346174911LithiumppmASTM D5185(m)<1	Phosphorus	ppm	ASTM D5185(m)	270	1514	▲ 1612	1 479
SulfurppmASTM D5185(m)11200480346174911LithiumppmASTM D5185(m)<1<1<1<1CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>75886SodiumppmASTM D5185(m)22<11PotassiumppmASTM D5185(m)>201<1<1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2			ASTM D5185(m)	0	9	6	11
LithiumppmASTM D5185(m)<1<1<1CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>75886SodiumppmASTM D5185(m)2<1	Sulfur		× /	11200		4 617	4 911
Silicon ppm ASTM D5185(m) >75 8 8 6 Sodium ppm ASTM D5185(m) 2 <1 1 Potassium ppm ASTM D5185(m) >20 1 <1 <1 FLUID DEGRADATION method limit/base current history1 history2	Lithium		ASTM D5185(m)		<1	<1	<1
Silicon ppm ASTM D5185(m) >75 8 8 6 Sodium ppm ASTM D5185(m) 2 <1	CONTAMINAN	TS	method	limit/base	current	history1	history2
SodiumppmASTM D5185(m)2<11PotassiumppmASTM D5185(m) >201<1			ASTM D5185(m)	>75	8		
Potassium ppm ASTM D5185(m) >20 1 <1 <1 FLUID DEGRADATION method limit/base current history1 history2			. /				
				>20			
	FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
	Acid Number (AN)	mg KOH/g	ASTM D974*		3 .44		

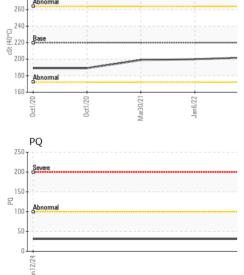


OIL ANALYSIS REPORT







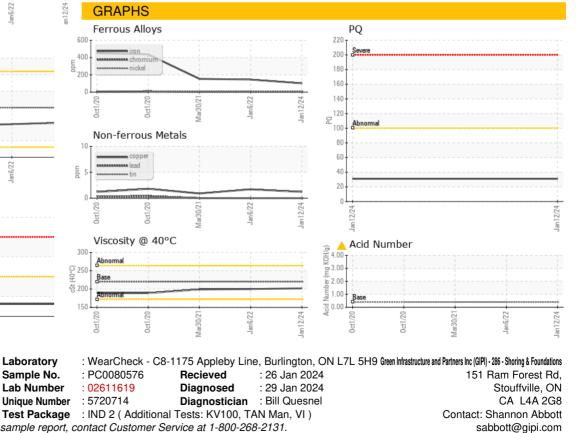


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Precipitate	scalar	Visual*	NONE	NONE	NONE	NONE
Silt	scalar	Visual*	NONE	NONE	NONE	LIGHT
Debris	scalar	Visual*	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	Visual*	NONE	NONE	NONE	NONE
Appearance	scalar	Visual*	NORML	NORML	NORML	NORML
Odor	scalar	Visual*	NORML	NORML	NORML	NORML
Emulsified Water	scalar	Visual*	>.2	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	220	202	200	199
Visc @ 100°C	cSt	ASTM D7279(m)	19.35	24.2	24.2	23.6
Viscosity Index (VI)	Scale	ASTM D2270*	99	148	150	146
SAMPLE IMAG	ES	method	limit/base	current	history1	history2
Color						









To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

CALA

ISO 17025:2017 Accredited

Laboratory

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Contact/Location: Shannon Abbott - GFL286

F:

T: (905)750-5900