

OIL ANALYSIS REPORT





Machine Id

1204 Component Rear Diesel Engine Fluid PETRO CANADA DURON HP 15W40 (24 LTR)

DIAGNOSIS

A Recommendation

We advise that you check for the source of the coolant leak. The oil change at the time of sampling has been noted. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal.

Contamination

Test for glycol is positive. There is a high concentration of glycol present in the oil.

Fluid Condition

Additive levels indicate the addition of a different brand, or type of oil. The oil is no longer serviceable due to the presence of contaminants.

SAMPLE INFORM	MATION	method	limit/base	current	history1	history2		
Sample Number		Client Info		PC0082786	PC0080271	PC0032172		
Sample Date		Client Info		14 Mar 2024	09 Jan 2024	29 Sep 2023		
Machine Age	kms	Client Info		725855	714096	700068		
	kme	Client Info		11614	12936	12416		
Oil Changed	KIIIO	Client Info		Changed	Changed	Changed		
Sample Status				SEVERE	NORMAL	NORMAI		
Campic Claus				SEVENE	NOTIMAL	. Top I that I have		
CONTAMINAT	ON	method	limit/base	current	history1	history2		
Fuel		WC Method	>5	<1.0	<1.0	<1.0		
Water		WC Method	>0.2	NEG	NEG	NEG		
	۹	method	limit/hase	current	history1	history?		
	9		100	Guirein	10	nistory2		
Iron	ppm	ASTM D5185(m)	>100	44	49	61		
Chromium	ppm	ASTM D5185(m)	>20	2	1	2		
Nickel	ppm	ASTM D5185(m)	>4	<1	<1	0		
Titanium	ppm	ASTM D5185(m)		0	0	0		
Silver	ppm	ASTM D5185(m)	>3	0	0	<1		
Aluminum	ppm	ASTM D5185(m)	>20	3	3	10		
Lead	ppm	ASTM D5185(m)	>40	<1	2	1		
Copper	ppm	ASTM D5185(m)	>330	2	2	4		
Tin	ppm	ASTM D5185(m)	>15	0	<1	<1		
Antimony	ppm	ASTM D5185(m)		0	0	0		
Vanadium	ppm	ASTM D5185(m)		0	0	0		
Donullium	nnm	ACTM DE10E(m)		0	0	0		
Derymum	ppiii	ASTIVI DOTOD(III)		U	0	0		
Cadmium	ppm	ASTM D5185(m)		0	0	0		
Cadmium ADDITIVES	ppm	ASTM D5185(m) ASTM D5185(m) method	limit/base	0 current	0 history1	0 history2		
Cadmium ADDITIVES Boron	ppm ppm	ASTM D5185(m) ASTM D5185(m) method ASTM D5185(m)	limit/base 0	0 0 current 91	0 0 history1 4	0 history2 6		
Cadmium ADDITIVES Boron Barium	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) Method ASTM D5185(m) ASTM D5185(m)	limit/base 0 0	0 0 current 91 <1	0 0 history1 4 0	0 history2 6 <1		
Cadmium ADDITIVES Boron Barium Molybdenum	ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(m) Method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base 0 0 60	0 0 91 <1 137	0 0 <u>history1</u> 4 0 68	0 history2 6 <1 68		
Cadmium ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base 0 0 60 0	0 0 2000 91 <1 137 0	0 history1 4 0 68 0	0 history2 6 <1 68 <1		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base 0 0 60 0 1010	0 0 91 <1 137 0 1012	0 0 history1 4 0 68 0 1101	0 history2 6 <1 68 <1 1067		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(IIII) ASTM D5185(IIIII) ASTM D5185(IIIIII) ASTM D5185(IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	limit/base 0 0 60 0 1010 1070	0 0 91 <1 137 0 1012 1211	0 history1 4 0 68 0 1101 1258	0 history2 6 <1 68 <1 1067 1261		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(IIII) ASTM D5185(IIII) ASTM D5185(IIII) ASTM D5185(IIII) ASTM D5185(IIII)	limit/base 0 0 60 0 1010 1070 1150	0 0 91 <1 137 0 1012 1211 1101	0 history1 4 0 68 0 1101 1258 1145	0 history2 6 <1 68 <1 1067 1261 1126		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(IIII) ASTM D5185(IIII) ASTM D5185(IIIII) ASTM D5185(IIIII) ASTM D5185(IIIII) ASTM D5185(IIIII)	limit/base 0 0 60 0 1010 1070 1150 1270	0 0 91 <1 137 0 1012 1211 1101 1273	0 history1 4 0 68 0 1101 1258 1145 1382	0 history2 6 <1 68 <1 1067 1261 1126 1368		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(III) ASTM D5185(IIII) ASTM D5185(IIII) ASTM D5185(IIIII) ASTM D5185(IIIII) ASTM D5185(IIIII) ASTM D5185(IIIII) ASTM D5185(IIIII)	limit/base 0 0 60 0 1010 1070 1150 1270 2060	0 0 20 91 <1 137 0 1012 1211 1101 1273 2729	0 0 history1 4 0 68 0 1101 1258 1145 1382 2787	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060	0 0 91 <1 137 0 1012 1211 1101 1273 2729 <1	0 0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060 limit/base	0 0 20 91 <1 137 0 1012 1211 1101 1273 2729 <1 current	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 history2		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25	0 0 20 91 <1 137 0 1012 1211 1101 1273 2729 <1 Current 42	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 kistory2 10		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060 ■ limit/base >25	0 0 current 91 <1 137 0 1012 1211 1101 1273 2729 <1 current 42 2153	0 0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 2616 <1 bistory2 10 31		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060 ■ 2060 ■ 225	0 Current 91 <1 137 0 1012 1211 1101 1273 2729 <1 Current 42 € 2153 ↓ 11	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9 1	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 kistory2 10 31 16		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium Clucol	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20	0 Current 91 <1 137 0 1012 1211 1101 1273 2729 <1 Current 42 ● 2153 ▲ 11 ◆ 70	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9 1 NEC	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 history2 10 31 16 0.0		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium Glycol	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060 2060 limit/base >25 >20	0 Current 91 <1 137 0 1012 1211 1101 1273 2729 <1 Current 42 2153 ▲ 11 ▲ >.70	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9 1 NEG	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 2616 <1 history2 10 31 16 0.0		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 0 0 10 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base	0 0 current 91 <1 137 0 1012 1211 1101 1273 2729 <1 current 42 2153 ▲ 11 ▲ >.70 current	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9 1 NEG history1	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 kistory2 10 31 16 0.0 history2		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 s20 limit/base >3	0 Current 91 <1 137 0 1012 1211 1101 1273 2729 <1 Current 42 2153 ▲ 11 ▲ >.70 Current 1.1	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9 1 NEG history1 1.7	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 history2 10 31 16 0.0 history2 2.5		
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(III) ASTM D5185(III)	limit/base 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >23 >20	0 Current 91 <1 137 0 1012 1211 1101 1273 2729 <1 Current 42 2153 ▲ 11 ▲ >.70 Current 1.1 1.7,4	0 history1 4 0 68 0 1101 1258 1145 1382 2787 <1 history1 6 9 1 NEG history1 1.7 13.5	0 history2 6 <1 68 <1 1067 1261 1126 1368 2616 <1 6 010 31 16 0.0 history2 2.5 13.9		



Aar12/7

ul16/2

Abnormal 140 120 (120 ()_0+100 ts Abr 80 60 40

45

40 35

160

140 120 Ba

(120 (0-0+) 100 \$5 A 80 60 40

cSt (100°C)

160

20 10

OIL ANALYSIS REPORT

FT-IR (Direct	Trend)					FLUID DEG	GRAD	DATION	method	limit/b	ase	current	hi	story1		history2
Oxidation					C	Dxidation		Abs/.1mm	ASTM D7414*	>25		18.8	23.3	3	22	2.9
Abnormal						VISUAL			method	limit/b	ase	current	hi	story1		history2
			\checkmark	-	E	Emulsified Wat	er	scalar	Visual*	>0.2		NEG	NE	G	Ν	EG
AD AND DE AD	and and a state of the state of			and a subscription of the	F	Free Water		scalar	Visual*			NEG	NE	G	Ν	EG
20	21-	23	23	24 -	-	FLUID PRO	OPE	RTIES	method	limit/b	ase	current	hi	story1		history2
0ct7, Mar12	Jull6	Feb22/	Jun23,	Jan9,	N	/isc @ 40°C		cSt	ASTM D7279(m)	118.2		116	105		1()9
Viscosity @ 4	10°C					/isc @ 100°C /iscosity Index	(\mathbf{M})	cSt Scale	ASTM D7279(m)	15.6		15.3 137	14.2	2	14	1.3 23
Abnormal		I I				GRAPHS	(•1)	Ocale	AOTIN DEETO	100		107	107			,0
Base		aadaaaa			-	Iron (ppm)						Lead (ppm)				
Abnormal	~		~	\checkmark	250	Severe					100.	Severe				
					200	Q					-08	. Ф				
/					100	Abnormal	1				E 40.	Abnormal				
ct7/20 -	116/21	22/22	23/23	an 9/24 -	50						20					
0 Wa	٦٢	Feb	Jun	5 C	0			2		+	0.	51	21	2	5	*
Viscosity @ 1	L00°C					0ct7/2 Mar12/	Jul16/	Feb22/2	Jun23/2	Jan 3/2		0ct7/2 Mar12/	Jul16/	Feb22/2	Jun23/2	Jan9/2
Abnormal						Aluminum (p	pm)		,			Chromium (ppm)		,	
Abnoranal				_	50-	Severe					50-	Severe				
°/					30						30.					
/					Ed 20-	Abnormal					Ed 20 -	Abnormal				
21	21		53	54	10				\sim		10-					
0ct7/5 Mar12/	Jul16/	Feb22/2	Jun23/2	Jan9/2	0	20	21-	22		74-7	0.	20	21	22	23	24
Viscosity @ 4	10°C					0ct7, Mar12	Jul16	Feb22/	Jun23,	Jany		0ct7, Mar12	Jul16	Feb 22/	Jun23,	Jan 9,
Abnormal					400.	Copper (ppm	ı)				80.	Silicon (ppm	ı)			
Base					200	Severe Abhormal					00	Severe				
	-		~	~	300-						- 6U					
Abingentia					늘 200·						눱 40·	Abnormal				1
/					100						20-	\sim		\wedge		
±7/20	16/21-	22/22	23/23	- 9/24 -	0	/20	5/21-	122 -	/23	47/	0.	12/20	3/21-	122	/23	124
Mai 00	٦L	Feb	Jun	Ja		0ct7 Mar11	Jull	Feb22	Jun23	Jans		0ct7 Mar11	Jult	Feb 22	Jun23	Jang
Silicon (ppm)				20-	Viscosity @ 1	00°C				2500-	Glycol Conta	aminatio	1		
D					18	Abnormal					2000	sodium	ım			0.20
					16- 0- 014-	Abnognal			· · · · · ·	>	е ¹⁵⁰⁰⁻					0.15 <u>a</u> e
Abnormal				/	12 cst (10	/					^{ਛੇ} 1000 ·					0.10
					10	/					500.					- 0.05

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 CALA : PC0082786 Received Sample No. : 05 Apr 2024 Lab Number : 02626867 Tested : 05 Apr 2024 ISO 17025:2017 Accredited Laboratory Unique Number : 5759999 Diagnosed : 08 Apr 2024 - Kevin Marson Test Package : MOB 1 (Additional Tests: Glycol, KV40, VI) 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.

Mar12/21-

Jul16/21.

eb22/22 -

Jun23/23

Jan9/24 -

0ct7/20 +

Mar12/21

116/2

6 0ct7/20 -

> 25 Messenger Drive St. John`s, NL CA A1B 0H6 Contact: Danny Oliver danny.oliver@metrobus.com T: (709)570-2025 F:

Jan 9/24

Metrobus Transit

Report Id: STJNEW [WCAMIS] 02626867 (Generated: 04/11/2024 08:41:00) Rev: 1

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Submitted By: Dan Finlay
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