

OIL ANALYSIS REPORT

Sample Rating Trend





Diesel Engine

Fluid PETRO CANADA DURON XL SYN BLEND 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.

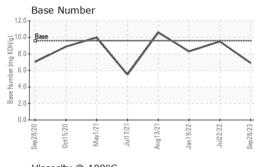
Fluid Condition

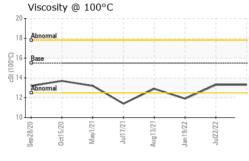
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0105055	PCA0054215	PCA0053923
Sample Date		Client Info		28 Sep 2023	22 Jul 2022	19 Jan 2022
Machine Age	mls	Client Info		609681	545225	511060
Oil Age	mls	Client Info		20000	20000	20000
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	0.1
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>165	23	14	8
Chromium	ppm	ASTM D5185m	>5	3	2	1
Nickel	ppm	ASTM D5185m	>4	0	<1	0
Titanium	ppm	ASTM D5185m	>2	0	0	0
Silver	ppm	ASTM D5185m	>2	0	<1	0
Aluminum	ppm	ASTM D5185m	>20	4	2	2
Lead	ppm	ASTM D5185m	>150	4	4	2
Copper	ppm	ASTM D5185m	>90	<1	1	1
Tin	ppm	ASTM D5185m	>5	1	<1	1
Antimony	ppm	ASTM D5185m				
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 0	history1 6	history2 8
	ppm ppm					· · · ·
Boron		ASTM D5185m	1	0	6	8
Boron Barium	ppm	ASTM D5185m ASTM D5185m	1	0 0	6 0 59 <1	8
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1 1 60 1 1010	0 0 64 <1 1006	6 0 59 <1 933	8 0 59 <1 978
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1 60 1 1010 1070	0 0 64 <1 1006 1121	6 0 59 <1 933 1106	8 0 59 <1 978 1151
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1 60 1 1010 1070 1150	0 0 64 <1 1006 1121 1023	6 0 59 <1 933 1106 976	8 0 59 <1 978 1151 1021
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270	0 0 64 <1 1006 1121 1023 1276	6 0 59 <1 933 1106 976 1197	8 0 59 <1 978 1151 1021 1207
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1 60 1 1010 1070 1150	0 0 64 <1 1006 1121 1023	6 0 59 <1 933 1106 976 1197 2772	8 0 59 <1 978 1151 1021 1207 2585
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270	0 0 64 <1 1006 1121 1023 1276 2986 current	6 0 59 <1 933 1106 976 1197 2772 history1	8 0 59 <1 978 1151 1021 1207
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	1 1 60 1 1010 1070 1150 1270 2060	0 0 64 <1 1006 1121 1023 1276 2986 current 18	6 0 59 <1 933 1106 976 1197 2772 history1 10	8 0 59 <1 978 1151 1021 1207 2585 history2 12
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 imit/base >35	0 0 64 <1 1006 1121 1023 1276 2986 current 18 4	6 0 59 <1 933 1106 976 1197 2772 history1 10 2	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	1 1 60 1 1010 1070 1150 1270 2060 imit/base >35	0 0 64 <1 1006 1121 1023 1276 2986 current 18	6 0 59 <1 933 1106 976 1197 2772 history1 10	8 0 59 <1 978 1151 1021 1207 2585 history2 12
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 imit/base >35	0 0 64 <1 1006 1121 1023 1276 2986 current 18 4	6 0 59 <1 933 1106 976 1197 2772 history1 10 2	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 limit/base >35 >20	0 0 64 <1 1006 1121 1023 1276 2986 current 18 4 4	6 0 59 <1 933 1106 976 1197 2772 history1 10 2 0	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 limit/base >20 limit/base	0 0 64 <1 1006 1121 1023 1276 2986 current 18 4 4 4 0.3 8.8	6 0 59 <1 933 1106 976 1197 2772 history1 10 2 2772 history1 0 0 history1 0.3 9.4	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0 <1 2 0 <1 history2 0.2 8.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 limit/base >35 >20 limit/base	0 0 64 <1 1006 1121 1023 1276 2986 current 18 4 4 4 current 0.3	6 0 59 <1 933 1106 976 1197 2772 history1 10 2 0 history1 0.3	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0 <1 2 history2 0.2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm t ppm ppm	ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 imit/base >35 20 imit/base >7.5 >20	0 0 64 <1 1006 1121 1023 1276 2986 current 18 4 4 4 0.3 8.8	6 0 59 <1 933 1106 976 1197 2772 history1 10 2 2772 history1 0 0 history1 0.3 9.4	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0 <1 2 0 <1 history2 0.2 8.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm t ppm ppm	ASTM D5185m ASTM D5185m	1 1 60 1 1010 1070 1150 1270 2060 imit/base >20 imit/base >7.5 >20 >30	0 0 64 <1 1006 1121 1023 1276 2986 <u>current</u> 18 4 4 4 4 <u>current</u> 0.3 8.8 20.1	6 0 59 <1 933 1106 976 1197 2772 history1 10 2 0 history1 0.3 9.4 21.2	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0 <1 2585 history2 0.2 8.4 20.0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	1 1 1 60 1 1010 1070 1150 2060 limit/base >35 20 limit/base >7.5 >20 >30 limit/base	0 0 64 <1 1006 1121 1023 1276 2986 Current 18 4 4 4 0.3 8.8 20.1 Current	6 0 59 <1 933 1106 976 1197 2772 history1 10 2 772 history1 0.3 9.4 21.2 history1	8 0 59 <1 978 1151 1021 1207 2585 history2 12 0 <1 12 0 <1 history2 0.2 8.4 20.0 history2



OIL ANALYSIS REPORT





		methoo	l limit	/base	current	:	hist	tory1		histor	y2
White Metal	scalar	*Visual	NON	E	NONE		NON	E	Ν	IONE	
Yellow Metal	scalar	*Visual	NON	E	NONE		NON	E	Ν	IONE	
Precipitate	scalar	*Visual	NON	E	NONE		NON	E	Ν	IONE	
Silt	scalar	*Visual	NON	E	NONE		NON	E	Ν	IONE	
Debris	scalar	*Visual	NON	E	NONE		NON	E	Ν	IONE	
Sand/Dirt	pearance scalar *Visua		NON	E	NONE NORML		NONE NORML		NONE NORML		
Appearance			NOR	ML							
Odor			sual NORML		NORML		NORML		NORML		
Emulsified Water scalar		*Visual	>0.2				NEG		NEG		
ree Water scalar		*Visual		NEG			NEG		NEG		
FLUID PROPE	RTIES	methoo	l limit	/base	current	:	hist	tory1		histor	y2
Visc @ 100°C	cSt	ASTM D4	45 15.5		13.3		13.3		 1	1.9	
GRAPHS						-					
Iron (ppm)					ead (ppn	ר)					
Severe				250	evere						
Abnormal				200-							
					bnormal			I	-		
	_			100 -							
				50							
Sep28/20 - Oct15/20 - May1/21 -	- 12/111- Aug13/21-	Jan 19/22 -	Jui22/22 - Sep28/23 -	Sep28/20	Oct15/20 -	May1/21.	Jul17/21-	Aug13/21-	Jan 19/22 -	Jul22/22 -	Sen 28/23
Sep2 Oct1 May	Aug1	Jan1	Juli Sep2	Sep 2	0ct1	Mar	Jult	Augl	Jan 1	Jul2	Cen 2
Aluminum (ppm)				С	hromium	ı (ppm	ı)				
Severe	11		1	¹²	evere						
				10 - 6 8 -							
Abnormal				E	hnormal						
				- 4- n	bnormal						
				2-	\searrow	-					
20+	21	22 -	23	2	20+	21	21	21	22	22	
Sep28/20 0ct15/20 May1/21	Aug13/21-	Jan 19/22	Jul22/22 Sep28/23	Sep28/20	0ct15/20	May1/21.	Jul17/21.	Aug13/21	Jan 19/22	Jul22/22	Sen 28/23
S O	, A	- T	~ ~		_		,	A	Ľ.	~	0
Copper (ppm)				с 80 т п	licon (pp	om)					
Severe				60 - 5	evere		I I I	1		1	
Abnormal				튭 40 - 6	bnormal						
				20 -							-
				0				-			
				0						22	Sen 28/23
28/20 - :15/20 - #y1/21-	13/21	19/22	28/23	28/20	15/20 -	ay1/21-	117/21-	13/2	19/22	22/2	
Sep28/20 Oct15/20 May1/21	Jull 7/21 Aug 13/21	Jan 19/22	Jul22/22 Sep28/23	Sep28/20	0ct15/20 -	May1/21-	Jul17/21-	Aug13/21-	Jan 19/22	Jul22/22	Cen
Oct15/20 0ct15/20 Nav1/21 Local 5/20 0ct15/20 0ct15/20 0ct15/20	Jun 1/21 Aug13/21	Jan 19/22	Jul22/22 Sep28/23	В	oct15/20- ase Num		Jul17/21-	Aug13/2	Jan 19/22	Jul22//	Can
02/82/deg Viscosity @ 100°C	Aug13/21	Jan 19/22	Jul22/22	B	ase Num		Jul17/21-	> - Aug13/2	Jan 19/22	Jul22/	Lay
Viscosity @ 100°C	Aug13/21	Jan 19/22	Jul22/22	B			-12/711uL		Jan 19/22	Jui22/	Can
02/82/meW 100°C	Jul 1/21 Aug 13/21	Jan 1 9/22	Jui 22/22 Jui 22/22	B	ase Num			4ng13/2	Jan 19/22	Jui22/	Cen
Viscosity @ 100°C	12//1/lpu	Jan 19/22	Jul22/22 Jul22/22 Sep 28/23	B	ase Num			Aug13/2	Jan 19/22	Jui22/	
Viscosity @ 100°C	1///IIIL	22/61 me/	Jul22/22 Jul22/22 Sep 28/23	B (b)HOX BW) Jack Control (12.0 (b)HOX BW) Jack Control (12.0 (b)H	ase Num		-12/21/nf	Valant August	Jan 19/22	Jui22/	
1271/New Viscosity @ 100°C				B (b)H000 B B B B B B B B B B B B B B B B B B	ase Num	ber	\checkmark		~		
Viscosity @ 100°C			Jul22/22 Sep28/23	B (b)HOX BW) Jack Control (12.0 (b)HOX BW) Jack Control (12.0 (b)H	ase Num		Jul17/21Jul17/21-	Aug13/21	Jan 19/22 Jan 19/22	Jui22/22	
02/91/100 02/91/000 02/91/000 02/91/000 02/91/000 00 00 00 00 00 00 00 00 00	01 Madia Received Diagnost	son Ave., d : C ed : C tician : V	Jui22/22 Sep 28/23	227513 23 23	ase Num	ber	12/L1Inc	Aug13/21	2761 Juer B HAF 2842 MOD	ZZZZZIN RVEST LADE ESTO US 95	TINC 9 RE , CA
02/97/46W Viscosity @ 100°C Viscosity @ 100°C Abnormal 02/97/46W Viscosity @ 100°C Viscosity @ 100°C	01 Madia Received Diagnost Diagnost	son Ave., d : C ed : C tician : V BN)	Cary, NC 04 Oct 200 05 Oct 200 Wes Davis	227513 23 23	ase Num	ber	LIZLING	B & 1	2206 Luer B HAF 2842 MOD Service	ESTO US 95 e Man	TINC 0 RE , CA 5356 age

To discuss this sample report, o * - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Laboratory Sample No. Lab Number **Unique Number Test Package**

10000

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

Certificate L2367

Contact/Location: Service Manager - BBHMOD

F: