

# **OIL ANALYSIS REPORT**





#### Component Diesel Engine

Fluid PETRO CANADA DURON SHP 10W30 (--- QTS)

## 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

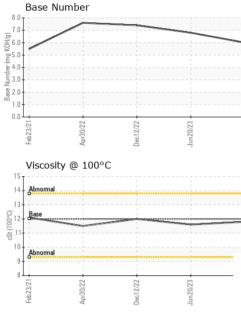
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0113228	PCA0096947	PCA0080915
Sample Date		Client Info		16 Jan 2024	20 Jun 2023	12 Dec 2022
Machine Age	mls	Client Info		155716	129554	104886
Oil Age	mls	Client Info		26162	24668	25138
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	21	33	35
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>4	0	0	0
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	3	3	5
Lead	ppm	ASTM D5185m	>40	0	0	<1
Copper	ppm	ASTM D5185m	>330	2	2	3
Tin	ppm	ASTM D5185m	>15	<1	0	<1
Vanadium	ppm	ASTM D5185m		<1	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 2	history1 2	history2 5
	ppm ppm					
Boron		ASTM D5185m	2	2	2	5
Boron Barium	ppm	ASTM D5185m ASTM D5185m	2 0 50	2 0	2 12	5 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50	2 0 56	2 12 72	5 0 63
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0	2 0 56 0	2 12 72 <1	5 0 63 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 950 1050 995	2 0 56 0 895	2 12 72 <1 933	5 0 63 <1 923
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950 1050	2 0 56 0 895 1038	2 12 72 <1 933 1148	5 0 63 <1 923 1141
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	2 0 50 950 1050 995	2 0 56 0 895 1038 974	2 12 72 <1 933 1148 984	5 0 63 <1 923 1141 997
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180	2 0 56 0 895 1038 974 1159	2 12 72 <1 933 1148 984 1257	5 0 63 <1 923 1141 997 1236
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 ASTM D5185m	2 0 50 0 950 1050 995 1180 2600	2 0 56 0 895 1038 974 1159 2561	2 12 72 <1 933 1148 984 1257 3061	5 0 63 <1 923 1141 997 1236 3189
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600	2 0 56 0 895 1038 974 1159 2561 current	2 12 72 <1 933 1148 984 1257 3061 history1	5 0 63 <1 923 1141 997 1236 3189 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	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 <b>method</b> ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b>	2 0 56 0 895 1038 974 1159 2561 current 6	2 12 72 <1 933 1148 984 1257 3061 history1 7	5 0 63 <1 923 1141 997 1236 3189 history2 8
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 <b>method</b> ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b>	2 0 56 0 895 1038 974 1159 2561 <u>current</u> 6 2	2 12 72 <1 933 1148 984 1257 3061 <b>history1</b> 7 1	5 0 63 <1 923 1141 997 1236 3189 history2 8 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	2 0 50 950 1050 995 1180 2600 <b>limit/base</b> >25 >20	2 0 56 0 895 1038 974 1159 2561 current 6 2 2 7	2 12 72 <1 933 1148 984 1257 3061 <b>history1</b> 7 1 9	5 0 63 <1 923 1141 997 1236 3189 history2 8 0 15
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b> >25 >20 <b>limit/base</b> >3	2 0 56 0 895 1038 974 1159 2561 current 6 2 7 7 current	2 12 72 <1 933 1148 984 1257 3061 history1 7 1 9 history1	5 0 63 <1 923 1141 997 1236 3189 history2 8 0 15 history2
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	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b> >25 >20 <b>limit/base</b> >3	2 0 56 0 895 1038 974 1159 2561 <i>current</i> 6 2 7 7 <i>current</i>	2 12 72 <1 933 1148 984 1257 3061 history1 7 1 9 history1 1.1	5 0 63 <1 923 1141 997 1236 3189 history2 8 0 15 history2 0.9
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 ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600 <i>imit/base</i> >25 >20 <i>imit/base</i> >3 >20	2 0 56 0 895 1038 974 1159 2561 <i>current</i> 6 2 7 <i>current</i> 1 9.8	2 12 72 <1 933 1148 984 1257 3061 history1 7 1 9 history1 1.1 1.1 11.0	5 0 63 <1 923 1141 997 1236 3189 history2 8 0 15 history2 0.9 11.2
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 ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>imit/base</b> >25 <b>imit/base</b> >3 >20	2 0 56 0 895 1038 974 1159 2561 <i>current</i> 6 2 7 7 <i>current</i> 1 9.8 22.4	2 12 72 <1 933 1148 984 1257 3061 history1 7 1 9 history1 1.1 1.1 1.1 22.9	5 0 63 <1 923 1141 997 1236 3189 history2 8 0 15 history2 0.9 11.2 23.8
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	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	2 0 0 50 0 950 1050 995 1180 2600 <b>imit/base</b> >25 20 >20 >30 >30 <b>imit/base</b>	2 0 56 0 895 1038 974 1159 2561 current 6 2 2 7 current 1 9.8 22.4 current	2 12 72 <1 933 1148 984 1257 3061 history1 7 1 9 history1 1.1 11.0 22.9 history1	5 0 63 <1 923 1141 997 1236 3189 history2 8 0 15 history2 0.9 11.2 23.8 history2



# **OIL ANALYSIS REPORT**

VISUAL



		VISUAL		methou	iiiiii/base	Current	Thistory I	Thistory 2		
		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	NONE		
		Debris	scalar	*Visual	NONE	NONE	NONE	NONE		
		Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE		
2/22	Jun20/23 - Jan16/24 -	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML		
Dec12/22	Jun2 Jan1	Odor	scalar	*Visual	NORML	NORML	NORML	NORML		
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG		
		Free Water	scalar	*Visual		NEG	NEG	NEG		
		FLUID PROP	ERTIES	method	limit/base	current	history1	history2		
		Visc @ 100°C	cSt	ASTM D445		11.8	11.6	12.0		
		GRAPHS								
		Ferrous Alloys								
		60 iron								
Dec12/22	Jun20/23	50 - chromium								
Dec	μη	40 -								
		Ē.30								
		20								
		10-								
		0								
		Feb23/21 Apr30/22	Dec12/22	Jun20/23	Jan 16/24					
		Feb	Decl	Jun2	Jan1					
		Non-ferrous Met	tals							
		10 copper 1								
		8 - tin								
		udd		1						
		4								
		2-								
		0-1	and and and a diversion of the local diversio							
		Feb23/21 Apr30/22	Dec12/22	Jun20/23	Jan 16/24					
		Apr	Dec	Jun	Jan					
		Viscosity @ 100	°C			Base Number				
		14 - Abnormal				7.0				
		13		I I I						
					KOH	5.0				
		12 - Base 00112 - 11-				1.0				
		5 11-			Number (mg KOH/g)	8.0				
		10- Abnormal			Base	2.0				
		9-				1.0-				
		8	2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			2			
		Feb23/21 Apr30/22	Dec12/22	Jun20/23	Jan 16/24	Feb 23/21 Apr30/22	Dec12/22	Jun20/23		
		Ap Ap	Dei	Jur	Jai	Ap Ap	Der	ηη		
	Laboratory	: WearCheck USA	- 501 Madis	13 NW WHIT	NW WHITE & CO - ANDERSON DIVISIO					
		: PCA0113228	3228 <b>Recieved</b> : 22 Jan 2024				2605 RIVER R			
	Sample No.				Jan 2024			PIEDMONT, S		
NAB	Lab Number	: 06066443	Diagnose							
	Lab Number Unique Number	: 10843120	Diagnose Diagnost		s Davis			US 2967		
ertificate L2367	Lab Number Unique Number Test Package	: 10843120	Diagnost	ician : We	s Davis		Contac			

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