

OIL ANALYSIS REPORT

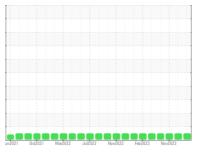
Sample Rating Trend

NORMAL

Plymouth & Brockton Machine Id 439

Component **Diesel Engine**

PETRO CANADA DURON SHP 15W40 (36 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.

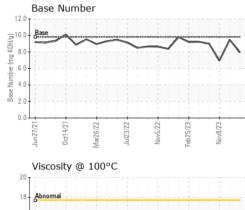
Fluid Condition

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

Sample Number Client Info PCA0110054 PCA0104398 PCA0104678 Sample Date Client Info Q2 Feb 2024 22 Dec 2023 08 Nov 2023 00 NoRMAL 08 NoRMAL			un2021 Oc	12021 Mar2022 Jul21	JZZ NOVZUZZ FEDZUZ3 N	pv2023	
Sample Date	SAMPLE INFOR	RMATION	method	limit/base	current	history1	history2
Machine Age mis Client Info 298664 287762 274881	Sample Number		Client Info		PCA0110054	PCA0104398	PCA0104679
Oil Age mls Client Info 24000 12000 24000 Oil Changed Sample Status Client Info Changed Not Changed Not Changed Changed NoRMAL NORMA	Sample Date		Client Info		02 Feb 2024	22 Dec 2023	08 Nov 2023
Client Info Changed NoRMAL NORMAL NORMAL NORMAL NORMAL	Machine Age	mls	Client Info		298664	287762	274881
NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2	Oil Age	mls	Client Info		24000	12000	24000
NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2	Oil Changed		Client Info		Changed	Not Changd	Changed
Fuel	-				_	NORMAL	
Water Glycol WC Method >0.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >165 17 8 18 Chromium ppm ASTM D5185m >5 <1 <1 <1 Nickel ppm ASTM D5185m >4 0 0 0 Silver ppm ASTM D5185m >2 1 1 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 2 2 Lead ppm ASTM D5185m >90 <1 <1 0 Copper ppm ASTM D5185m >5 0 <1 <1 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 ASTM D5185m 0 8 16<	CONTAMINAT	ΓΙΟΝ	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Irron	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	_S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>165	17	8	18
Titanium	Chromium	ppm	ASTM D5185m	>5	<1	<1	<1
Titanium	Nickel		ASTM D5185m	>4	0	0	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 2 2 Lead ppm ASTM D5185m >150 0 <1 0 Copper ppm ASTM D5185m >90 <1 <1 0 Vanadium ppm ASTM D5185m 0 <1 <1 0 Vanadium ppm ASTM D5185m 0 0 <1 <1 Vanadium ppm ASTM D5185m 0 0 <0 0 Cadmium ppm ASTM D5185m 0 8 16 4 Boron ppm ASTM D5185m 0 8 16 4 Barium ppm ASTM D5185m 0 3 0 0 Molydenum ppm ASTM D5185m 0 3 0 0 Mangaesium ppm ASTM D5185m 1010 923 898	Titanium		ASTM D5185m	>2	1	1	0
Aluminum	Silver		ASTM D5185m	>2	0	0	0
Lead ppm ASTM D5185m >150 0 <1 0 Copper ppm ASTM D5185m >90 <1 <1 0 Tin ppm ASTM D5185m >5 0 <1 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 16 4 Barium ppm ASTM D5185m 0 3 0 0 Molybdenum ppm ASTM D5185m 0 67 58 61 Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 923 898 946 Calcium ppm ASTM D5185m	Aluminum	- ' '		>20			2
Copper ppm ASTM D5185m >90 <1 <1 0 Tin ppm ASTM D5185m >5 0 <1							
Tin					-		
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 16 4 Barium ppm ASTM D5185m 0 3 0 0 Molybdenum ppm ASTM D5185m 60 67 58 61 Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 923 898 946 Calcium ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current							
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 8 16 4 Barium ppm ASTM D5185m 0 3 0 0 Molybdenum ppm ASTM D5185m 60 67 58 61 Manganese ppm ASTM D5185m 0 0 <1				70			
ADDITIVES							
Boron		ррпп		1: 1: 0			
Barium ppm ASTM D5185m 0 3 0 0 Molybdenum ppm ASTM D5185m 60 67 58 61 Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 923 898 946 Calcium ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m >20 2 -1 0 INFRA-RED method limi	ADDITIVES		method				
Molybdenum ppm ASTM D5185m 60 67 58 61 Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 923 898 946 Calcium ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1150 960 983 1014 Zinc ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m >20 2 <1 0 INFRA-RED method limit/base current history1 history2 Soot % *6 *ASTM D7844 >7.5							
Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 923 898 946 Calcium ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1150 960 983 1014 Zinc ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m >20 2 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.2 1.2 2.2 Nitration Abs/cm *ASTM D		ppm					
Magnesium ppm ASTM D5185m 1010 923 898 946 Calcium ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1150 960 983 1014 Zinc ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m >20 2 <1	-						
Calcium ppm ASTM D5185m 1070 1085 1035 1111 Phosphorus ppm ASTM D5185m 1150 960 983 1014 Zinc ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m >20 2 <1	Manganese	ppm	ASTM D5185m	0	0		<1
Phosphorus ppm ASTM D5185m 1150 960 983 1014 Zinc ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m >0 2 <1	Magnesium	ppm	ASTM D5185m	1010	923	898	946
Zinc ppm ASTM D5185m 1270 1221 1216 1290 Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 3 4 Sodium ppm ASTM D5185m 0 2 <1	Calcium	ppm	ASTM D5185m	1070	1085	1035	1111
Sulfur ppm ASTM D5185m 2060 3094 3018 2919 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 4 Sodium ppm ASTM D5185m 0 2 <1	Phosphorus	ppm	ASTM D5185m	1150	960	983	1014
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >35 3 4 Sodium ppm ASTM D5185m 0 2 <1	Zinc	ppm	ASTM D5185m	1270	1221	1216	1290
Silicon ppm ASTM D5185m >35 3 4 Sodium ppm ASTM D5185m 0 2 <1 Potassium ppm ASTM D5185m >20 2 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.2 1.2 2.2 Nitration Abs/cm *ASTM D7624 >20 9.9 7.5 11.2 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 19.4 25.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	Sulfur	ppm	ASTM D5185m	2060	3094	3018	2919
Sodium ppm ASTM D5185m 0 2 <1 Potassium ppm ASTM D5185m >20 2 <1	CONTAMINAN	NTS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 2 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.2 1.2 2.2 Nitration Abs/cm *ASTM D7624 >20 9.9 7.5 11.2 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 19.4 25.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	Silicon	ppm	ASTM D5185m	>35			4
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >7.5 2.2 1.2 2.2 Nitration Abs/cm *ASTM D7624 >20 9.9 7.5 11.2 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 19.4 25.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	Sodium	ppm	ASTM D5185m		0	2	<1
Soot % % *ASTM D7844 > 7.5 2.2 1.2 2.2 Nitration Abs/cm *ASTM D7624 > 20 9.9 7.5 11.2 Sulfation Abs/.1mm *ASTM D7415 > 30 22.4 19.4 25.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 15.0 13.3 18.9	Potassium	ppm	ASTM D5185m	>20	2	<1	0
Nitration Abs/cm *ASTM D7624 >20 9.9 7.5 11.2 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 19.4 25.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 22.4 19.4 25.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	Soot %	%	*ASTM D7844	>7.5	2.2	1.2	2.2
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	Nitration	Abs/cm	*ASTM D7624	>20	9.9	7.5	11.2
Oxidation Abs/.1mm *ASTM D7414 >25 15.0 13.3 18.9	Sulfation	Abs/.1mm	*ASTM D7415	>30	22.4	19.4	25.3
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.0	13.3	18.9
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	7.95	9.47	6.95

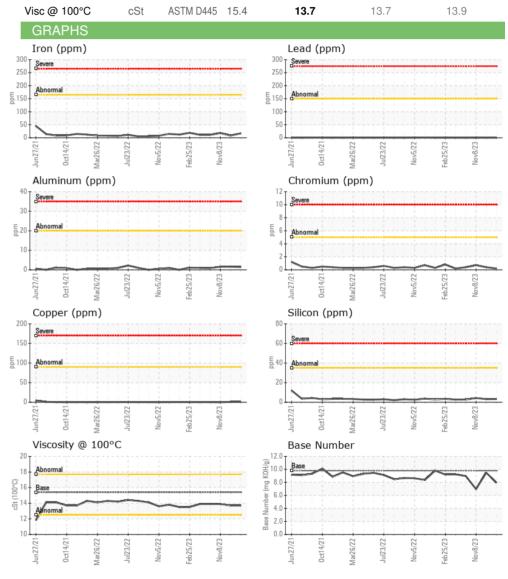


OIL ANALYSIS REPORT



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	NONE
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	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	FLUID PROPERTIES		limit/base	current	history1	history2
T LOID I HOI L	· · · · LO	method		34		

Visc 20 T	osity (0 100°	C				
18 - Abno	rmal						
16 - Base							
16 - Base	~			<u></u>			
	rmal						
10	111	ш					_
Jun27/2	Oct14/21	Mar26/22	Jul23/22	Nov5/22	Feb25/23	Nov8/23	
7	J	Σ	-7		ď.	_	







Laboratory Sample No.

Lab Number : 06094391 Unique Number: 10887244

: PCA0110054 Test Package : MOB 2

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : 20 Feb 2024 Received **Tested**

: 21 Feb 2024 : 21 Feb 2024 - Wes Davis Diagnosed

PLYMOUTH & BROCKTON 8 INDUSTRIAL PARK RD PLYMOUTH, MA US 02360

Contact: Donald Pelpquin Dpeloquin@P-B.com T: (508)732-6039

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

F: (508)732-6091