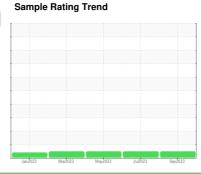


OIL ANALYSIS REPORT

Plymouth & Brockton 11451

Component **Diesel Engine**

PETRO CANADA DURON SHP 15W40 (--- GAL)





DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Metal levels are typical for a new component breaking in.

Contamination

There is no indication of any contamination in the

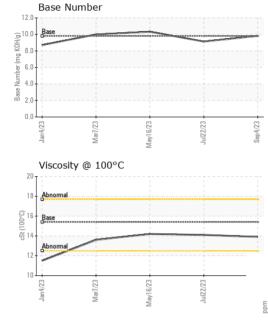
Fluid Condition

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

Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age mls Client Info 60135 48212 35694 Oil Age mls Client Info 12000 24000 12000 Oil Changed Client Info Not Change Changed Not Change Sample Status NoRMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >90 9 24 15 Chromium ppm ASTM D5185m >20 <1	Sample Number		Client Info		PCA0083326	PCA0013293	PCA0090612
Oil Age mls Client Info 12000 24000 12000 Oil Changed Client Info Not Changed Not	Sample Date		Client Info		04 Sep 2023	22 Jul 2023	16 May 2023
Oil Changed Sample Status Client Info Not Changed NORMAL Not Cha	Machine Age	mls	Client Info		60135	48212	35694
Oil Changed Sample Status Client Info Sample Status Not Change NORMAL NormAll Nor	Oil Age	mls	Client Info		12000	24000	12000
Sample Status			Client Info		Not Changd	Changed	Not Changd
Fuel	•					Ü	Ŭ
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >90 9 24 15 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 0 <1 0 Silver ppm ASTM D5185m >2 0 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 0 0 Aluminum ppm ASTM D5185m >40 0 <1 0 0 0 0 0 0 1 0 0 1 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>90	9	24	15
Titanium ppm ASTM D5185m >2 0 <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>2	0	0	<1
Aluminum ppm ASTM D5185m >20 0 1 0 Lead ppm ASTM D5185m >40 0 <1	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Lead ppm ASTM D5185m >40 0 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 0 4 1 Tin ppm ASTM D5185m >15 0 0 <1	Aluminum	ppm	ASTM D5185m	>20	0	1	0
Tin ppm ASTM D5185m >15 0 0 <1	Lead	ppm	ASTM D5185m	>40	0	<1	0
Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history Boron ppm ASTM D5185m 0 11 3 4 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 65 61 61 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current	Copper	ppm	ASTM D5185m	>330	0	4	1
Vanadium ppm ASTM D5185m 0 <1	Tin	ppm	ASTM D5185m	>15	0	0	<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 11 3 4 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 65 61 61 Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m <th>Vanadium</th> <th>• • • • • • • • • • • • • • • • • • • •</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th><1</th> <th>0</th>	Vanadium	• • • • • • • • • • • • • • • • • • • •	ASTM D5185m		0	<1	0
Boron	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 65 61 61 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 65 61 61 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >20 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base	Boron	ppm	ASTM D5185m	0	11	3	4
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >20 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1	Barium	ppm	ASTM D5185m	0	0	0	0
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >20 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1	Molybdenum	ppm	ASTM D5185m	60	65	61	61
Magnesium ppm ASTM D5185m 1010 1072 977 943 Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >20 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1	Manganese		ASTM D5185m	0	<1	<1	<1
Calcium ppm ASTM D5185m 1070 1333 1128 1084 Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1	-		ASTM D5185m	1010	1072	977	943
Phosphorus ppm ASTM D5185m 1150 1138 986 1005 Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1	-		ASTM D5185m		1333	1128	1084
Zinc ppm ASTM D5185m 1270 1500 1272 1223 Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7644 >6 0.7 1.7 1.2 Nitration Abs/cm *ASTM D7624 >20 7.4 9.8 7.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D741	Phosphorus			1150	1138	986	1005
Sulfur ppm ASTM D5185m 2060 4273 3482 3332 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m >0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >6 0.7 1.7 1.2 Nitration Abs/cm *ASTM D7624 >20 7.4 9.8 7.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1							
Silicon ppm ASTM D5185m >25 2 4 3 Sodium ppm ASTM D5185m 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1							
Sodium ppm ASTM D5185m 0 6 2 Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >6 0.7 1.7 1.2 Nitration Abs/cm *ASTM D7624 >20 7.4 9.8 7.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 2 <1	Silicon	ppm	ASTM D5185m	>25	2	4	3
Potassium ppm ASTM D5185m >20 0 2 <1	Sodium		ASTM D5185m		0	6	2
Soot % % *ASTM D7844 >6 0.7 1.7 1.2 Nitration Abs/cm *ASTM D7624 >20 7.4 9.8 7.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1	Potassium		ASTM D5185m	>20	0	2	<1
Nitration Abs/cm *ASTM D7624 >20 7.4 9.8 7.5 Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history1 history Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1	Soot %	%	*ASTM D7844	>6	0.7	1.7	1.2
Sulfation Abs/.1mm *ASTM D7415 >30 19.5 21.9 20.5 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1		Abs/cm	*ASTM D7624	>20	7.4	9.8	7.5
Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.5 14.1							
	Sullation	AUS/.TITIIII	71011111111111		.0.0		
				limit/base			history2
	FLUID DEGRAD	DATION	method		current	history1	



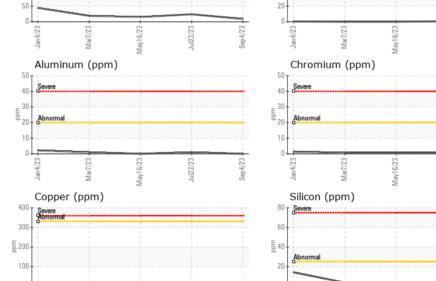
OIL ANALYSIS REPORT

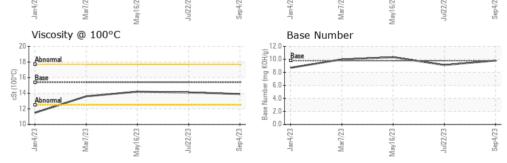


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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	RTIES	method	limit/hase	current	history1	history2

	I LOID I HOI						
	Visc @ 100°C	cSt	ASTM D445	15.4	13.9	14.1	14.2
	GRAPHS						
	Iron (ppm)				Lead (ppm)		
2	^{!50} T ;				100		

60









Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** Test Package : MOB 2

150

: PCA0083326 : 05951607 : 10647566

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received

: 14 Sep 2023 : 18 Sep 2023 Diagnosed

Diagnostician : Wes Davis

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)

PLYMOUTH & BROCKTON

8 INDUSTRIAL PARK RD PLYMOUTH, MA US 02360

Contact: Donald Pelpquin Dpeloquin@P-B.com

T: (508)732-6039 F: (508)732-6091