

# **OIL ANALYSIS REPORT**

### Sample Rating Trend

NORMAL



# Plymouth & Brockton 11449

Diesel Engine

PETRO CANADA 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.

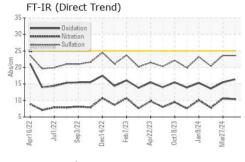
#### **Fluid Condition**

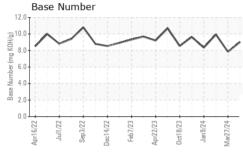
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

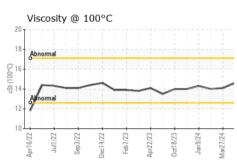
SAMPLE INFORMATION   method   fimilibase   current   history1   history2			picocc outo	LE OUPLOIL DOULDEL TO	ACCO PRINCES OURSES			
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2	
Machine Age         mls         Client Info         250823         226763         215550           Oil Age         mls         Client Info         24000         24000         12000           Oil Changed         Client Info         Changed         Changed         Not Changd           Sample Status         NoRMAL         NORMAL         NORMAL         NORMAL           CONTAMINATION           method         Imitibase         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Water         WC Method         NEG         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         0         NEG	Sample Number		Client Info		PCA0110099	PCA0104438	PCA0109872	
Oil Age         mls         Client Info         24000         24000         12000           Oil Changed         Client Info         Changed         Changed And Changed Not Changd Not Changed Not Ch			Client Info		21 Jun 2024	27 Mar 2024	19 Feb 2024	
Oil Changed Sample Status         Client Info         Changed NORMAL         Changed NORMAL         Not Change Normal </th <th>Machine Age</th> <th>mls</th> <th>Client Info</th> <th></th> <th>250823</th> <th>226763</th> <th>215550</th>	Machine Age	mls	Client Info		250823	226763	215550	
NORMAL   NORMAL   NORMAL	Oil Age	mls	Client Info		24000	24000	12000	
NORMAL   NORMAL   NORMAL	-		Client Info		Changed	Changed	Not Changd	
Fuel					_		NORMAL	
Water Glycol         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >90         21         21         12           Chromium         ppm         ASTM D5185m         >20         2         2         <1	CONTAMINAT	ION	method	limit/base	current	history1	history2	
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0	
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >90         21         21         21         12           Chromium         ppm         ASTM D5185m         >20         2         2         2         1           Nickel         ppm         ASTM D5185m         >2         <1         <1         0         0           Titanium         ppm         ASTM D5185m         >2         <1         0         0         0         0         A         0	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium         ppm         ASTM D5185m         >20         2         2         <1	WEAR METAL	S	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>90	21	21	12	
Titanium         ppm         ASTM D5185m         >2         <1	Chromium	ppm	ASTM D5185m	>20	2	2	<1	
Silver	Nickel	ppm	ASTM D5185m	>2	<1	<1	0	
Aluminum	Titanium	ppm	ASTM D5185m	>2	<1	<1	0	
Lead         ppm         ASTM D5185m         >40         0         2         0           Copper         ppm         ASTM D5185m         >330         1         <1	Silver	ppm	ASTM D5185m	>2	<1	0	0	
Copper         ppm         ASTM D5185m         >3330         1         <1	Aluminum	ppm	ASTM D5185m	>20	3	3	1	
Tin         ppm         ASTM D5185m         >15         <1	Lead	ppm	ASTM D5185m	>40	0	2	0	
Vanadium         ppm         ASTM D5185m         <1	Copper	ppm	ASTM D5185m	>330	1	<1	<1	
Cadmium         ppm         ASTM D5185m         <1	Tin	ppm	ASTM D5185m	>15	<1	2	0	
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         4         4         7           Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         69         60         59           Manganese         ppm         ASTM D5185m         -1         -1         0           Magnesium         ppm         ASTM D5185m         957         998         914           Calcium         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         9           INFRA-RED         method         limit/base         current         hi	Vanadium	ppm	ASTM D5185m		<1	<1	<1	
Boron	Cadmium	ppm	ASTM D5185m		<1	<1	0	
Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         69         60         59           Manganese         ppm         ASTM D5185m         <1         <1         0           Magnesium         ppm         ASTM D5185m         957         998         914           Calcium         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         1256         1369         1142           Sulfur         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         "ASTM D7844         >6	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum         ppm         ASTM D5185m         69         60         59           Manganese         ppm         ASTM D5185m         <1	Boron	ppm	ASTM D5185m		4	4	7	
Manganese         ppm         ASTM D5185m         <1	Barium	ppm	ASTM D5185m		0	0	0	
Magnesium         ppm         ASTM D5185m         957         998         914           Calcium         ppm         ASTM D5185m         1132         1223         1085           Phosphorus         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         1256         1369         1142           Sulfur         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/:nm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/:nm         *ASTM D7415         >30         23.6         23.6         20.4 <td col<="" th=""><th>Molybdenum</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>69</th><th>60</th><th>59</th></td>	<th>Molybdenum</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>69</th> <th>60</th> <th>59</th>	Molybdenum	ppm	ASTM D5185m		69	60	59
Calcium         ppm         ASTM D5185m         1132         1223         1085           Phosphorus         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         1256         1369         1142           Sulfur         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history	Manganese	ppm	ASTM D5185m		<1	<1	0	
Phosphorus         ppm         ASTM D5185m         952         1107         987           Zinc         ppm         ASTM D5185m         1256         1369         1142           Sulfur         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4<	Magnesium	ppm	ASTM D5185m		957	998	914	
Zinc         ppm         ASTM D5185m         1256         1369         1142           Sulfur         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         2         10           Potassium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         "ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         "ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         "ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         "ASTM D7414         >25	Calcium	ppm	ASTM D5185m		1132	1223	1085	
Sulfur         ppm         ASTM D5185m         2932         3673         3367           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         >20         2         10           Potassium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	Phosphorus	ppm	ASTM D5185m		952	1107	987	
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         <1         2         10           Potassium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	Zinc	ppm	ASTM D5185m		1256	1369	1142	
Silicon         ppm         ASTM D5185m         >25         5         4         2           Sodium         ppm         ASTM D5185m         <1	Sulfur	ppm	ASTM D5185m		2932	3673	3367	
Sodium         ppm         ASTM D5185m         <1	CONTAMINAN	TS	method	limit/base	current	history1	history2	
Potassium         ppm         ASTM D5185m         >20         2         2         9           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	Silicon	ppm	ASTM D5185m	>25	5	4	2	
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	Sodium	ppm	ASTM D5185m		<1	2	10	
Soot %         %         *ASTM D7844         >6         2.3         2.8         1.7           Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	Potassium	ppm	ASTM D5185m	>20	2	2	9	
Nitration         Abs/cm         *ASTM D7624         >20         10.4         10.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation         Abs/.1mm         *ASTM D7415         >30         23.6         23.6         20.4           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.4         15.5         13.6	Soot %	%	*ASTM D7844	>6	2.3	2.8	1.7	
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     16.4     15.5     13.6	Nitration	Abs/cm	*ASTM D7624	>20	10.4	10.6	7.8	
Oxidation Abs/.1mm *ASTM D7414 >25 <b>16.4</b> 15.5 13.6	Sulfation	Abs/.1mm	*ASTM D7415	>30	23.6	23.6	20.4	
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2	
	Oxidation	Abs/.1mm	*ASTM D7414	>25	16.4	15.5	13.6	



# **OIL ANALYSIS REPORT**





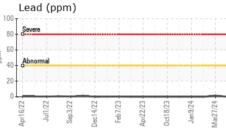


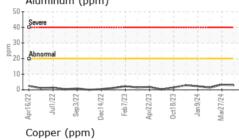
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
	oou.u.	1.000.		-1		

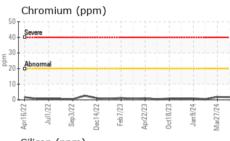
FLUID FROF	ENTIES	memou		HISTOLAL	HISTOLYZ
Visc @ 100°C	cSt	ASTM D445	14.6	14.1	14.0

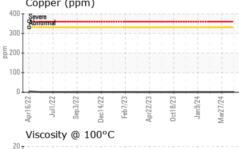
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722	722	/22	/22	/23	733	73	/24	/24
Apr16/22	Jul1/22	Sep3/22 -	Jec14/22	Feb7/23	Apr22/23	0ct18/23	Jan 9/24	Mar27/24

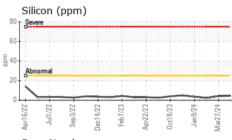
**GRAPHS** 

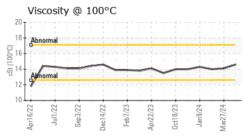


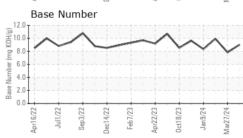
















Laboratory Sample No. Unique Number : 11113864

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0110099 Lab Number : 06230371

Received **Tested** 

: 08 Jul 2024 : 09 Jul 2024

Diagnosed : 09 Jul 2024 - Wes Davis

Test Package : MOB 2 Certificate 12367 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

Report Id: PLYPLYUS [WUSCAR] 06230371 (Generated: 07/09/2024 15:31:54) Rev: 1

Submitted By: Donald Pelpquin