

# **OIL ANALYSIS REPORT**



#### Machine Id 236424 Component Diesel Engine Fluid PETRO CANADA DURON SHP 10W30 (--- GAL)

## DIAGNOSIS

#### Recommendation

The oil change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

### Contamination

Elevated aluminum (Al) and/or lead (Pb) and potassium (K) levels in your metals analysis are likely a result of solder flux release into the lubricant and is common on new equipment/components. There is no indication of any contamination in the oil.

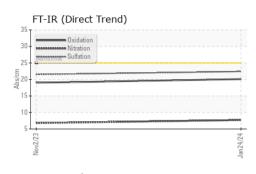
#### Fluid Condition

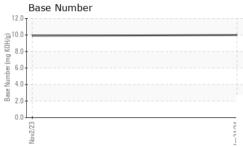
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

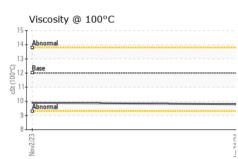
SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0110150	PCA0099707	
Sample Date		Client Info		24 Jan 2024	02 Nov 2023	
Machine Age	mls	Client Info		12289	0	
Oil Age	mls	Client Info		12289	10000	
Oil Changed		Client Info		Changed	Changed	
Sample Status				NORMAL	NORMAL	
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	
Water		WC Method	>0.2	NEG	NEG	
Glycol		WC Method		NEG	NEG	
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	79	19	
Chromium	ppm	ASTM D5185m	>20	2	1	
Nickel	ppm	ASTM D5185m	>4	0	6	
Titanium	ppm	ASTM D5185m		0	<1	
Silver	ppm	ASTM D5185m	>3	0	0	
Aluminum	ppm	ASTM D5185m	>20	25	2	
Lead	ppm	ASTM D5185m	>40	0	1	
Copper	ppm	ASTM D5185m	>330	27	2	
Tin	ppm	ASTM D5185m	>15	3	<1	
Vanadium	ppm	ASTM D5185m		0	0	
Cadmium	ppm	ASTM D5185m		0	0	
ADDITIVES		method	limit/base	current	history1	history2
NBBIIII 20		mothod		ounon		
Boron	ppm	ASTM D5185m	2	35	2	
	ppm ppm					
Boron		ASTM D5185m	2	35	2	
Boron Barium	ppm	ASTM D5185m ASTM D5185m	2 0	35 0	2 0	
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50	35 0 45	2 0 71	
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0	35 0 45 8	2 0 71 <1	
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950	35 0 45 8 582	2 0 71 <1 1037	
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	35 0 45 8 582 1661	2 0 71 <1 1037 1146	   
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 0 950 1050 995	35 0 45 8 582 1661 841	2 0 71 <1 1037 1146 1140	   
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	35 0 45 8 582 1661 841 986	2 0 71 <1 1037 1146 1140 1340	
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 ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600	35 0 45 8 582 1661 841 986 2928	2 0 71 <1 1037 1146 1140 1340 3614	
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	2 0 50 950 1050 995 1180 2600	35 0 45 8 582 1661 841 986 2928 current	2 0 71 <1 1037 1146 1140 1340 3614 history1	      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 ASTM D5185m	2 0 50 950 1050 995 1180 2600	35 0 45 8 582 1661 841 986 2928 current 11	2 0 71 <1 1037 1146 1140 1340 3614 history1 8	     history2
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 ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600 <b>limit/base</b>	35 0 45 8 582 1661 841 986 2928 <u>current</u> 11 6	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0	     history2
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	35 0 45 8 582 1661 841 986 2928 current 11 6 6 60	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0 2	     history2  
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>Imit/base</b> >25 >20	35 0 45 8 582 1661 841 986 2928 current 11 6 6 60 current	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0 2 2 history1	     history2    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	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>Imit/base</b> >25 >20 <b>Imit/base</b> >3	35 0 45 8 582 1661 841 986 2928 current 11 6 6 60 current 0.4	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0 2 history1 0.3	     history2   history2
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 0 950 1050 995 1180 2600 <i>imit/base</i> >25 >20 <i>imit/base</i> >3 >20	35 0 45 8 582 1661 841 986 2928 current 11 6 60 current 0.4 7.7	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0 2 history1 0.3 6.8	     history2   history2
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	35 0 45 8 582 1661 841 986 2928 <b>current</b> 11 6 6 60 <b>current</b> 0.4 7.7 22.4	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0 2 <u>history1</u> 0.3 6.8 21.5	     history2  history2  history2
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 D7844 *ASTM D7844	2 0 50 0 950 1050 995 1180 2600 <b>imit/base</b> >25 >20 <b>imit/base</b> >3 >20 >30	35 0 45 8 582 1661 841 986 2928 current 11 6 60 current 0.4 7.7 22.4 current	2 0 71 <1 1037 1146 1140 1340 3614 history1 8 0 2 history1 0.3 6.8 21.5 history1	     history2  history2  history2  history2



# **OIL ANALYSIS REPORT**







White Metal sca Yellow Metal sca Precipitate sca Silt sca Debris sca Sand/Dirt sca Appearance sca Odor sca Emulsified Water sca Free Water sca FLUID PROPERTIE Visc @ 100°C cSt GRAPHS Iron (ppm) Severe Abnomal Abnomal Copper (ppm)	alar *Visual alar *Visual	Jan24/24	9.8 Lead (ppm		 
Precipitate sca Silt sca Debris sca Sand/Dirt sca Appearance sca Ddor sca Emulsified Water sca Free Water sca FLUID PROPERTIE Visc @ 100°C cSt GRAPHS Iron (ppm) Severe Abnormal Copper (ppm)	alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual	NONE NONE NONE NORML NORML >0.2 limit/bass 12.00	NONE NONE NONE NOR NOR NOR NOR NOR NEG NEG Securrent 9.8	NONE NONE NONE NORML NEG NEG history1 9.9	    history2
Silt sca Debris sca Sand/Dirt sca Appearance sca Ddor sca Emulsified Water sca Free Water sca FLUID PROPERTIE /isc @ 100°C cSt GRAPHS Iron (ppm)	alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual	NONE NONE NONE NORML NORML >0.2 limit/base 12.00	NONE NONE NOR NOR NOR NOR NEG NEG 9.8 Lead (ppm	NONE NONE NORML NORML NEG NEG history1 9.9	    history2
Debris sca Sand/Dirt sca Appearance sca Ddor sca Emulsified Water sca Free Water sca FLUID PROPERTIE /isc @ 100°C cSt GRAPHS Iron (ppm)	alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual	NONE NORML NORML >0.2 iimit/base	NONE NONE NORML NORML NEG NEG 9.8 Lead (ppm	NONE NORML NORML NEG NEG history1 9.9	    history2
Sand/Dirt sca Appearance sca Odor sca Emulsified Water sca Free Water sca FLUID PROPERTIE /isc @ 100°C cSt GRAPHS Iron (ppm)	alar *Visual alar *Visual alar *Visual alar *Visual alar *Visual ES method	NONE NORML >0.2 limit/base 12.00	NONE NORML NORML NEG NEG e current 9.8 Lead (ppm	NONE NORML NEG NEG history1 9.9	   history2
Appearance sca Ddor sca Emulsified Water sca Free Water sca FLUID PROPERTIE /isc @ 100°C cSt GRAPHS Iron (ppm) Severe Abnormal	alar *Visual alar *Visual alar *Visual alar *Visual ES method	NORML NORML >0.2 limit/bass 12.00	NORML NORML NEG NEG Current 9.8 Lead (ppm	NORML NORML NEG history1 9.9	   history2
Copper (ppm)	alar *Visual alar *Visual alar *Visual ES method	NORML >0.2	NORML NEG NEG Current 9.8 Lead (ppm	NORML NEG history1 9.9	  history2
Emulsified Water scal Free Water scal FLUID PROPERTIE /isc @ 100°C cSt GRAPHS Iron (ppm) Severe Abnormal EECO Copper (ppm)	alar *Visual alar *Visual ES method	>0.2 limit/bass 12.00	NEG NEG 9.8 Lead (ppm 40 Abnomal 20 0 EXTENSION 20 20 0 EXTENSION 20 20 0 EXTENSION 20 0 EXTENSION 20 20 20 20 20 20 20 20 20 20 20 20 20	NEG NEG history1 9.9	  history2
Free Water sca FLUID PROPERTIE /isc @ 100°C cSt GRAPHS Iron (ppm) Severe Abnormal FECTOOD Copper (ppm)	alar *Visual ES method	limit/base 12.00	NEG current 9.8 Lead (ppm	NEG history1 9.9	 history2
FLUID PROPERTIE	ES method	12.00	9.8 Lead (ppm	history1 9.9	history2
/isc @ 100°C cSt GRAPHS Iron (ppm) Severe Abnormal Aluminum (ppm) Severe Copper (ppm)		12.00	9.8 Lead (ppm	9.9	
GRAPHS Iron (ppm) Severe Abnormal Aluminum (ppm) Severe Abnormal Copper (ppm)	ASTM D445	Jan24/24	Lead (ppm 100 80 80 40 40 80 80 80 80 Chromium 50 40 80 80 80 80 80 80 80 80 80 8	)	
Iron (ppm)		Jan24/24	100 80 80 60 40 40 0 0 0 0 0 0 0 0 0 0 0 0 0		
Aluminum (ppm)		Jan24/24	100 80 80 60 40 40 0 0 0 0 0 0 0 0 0 0 0 0 0		
Abnormal Abnormal Abnormal EE27000 Aluminum (ppm) Severe Command Copper (ppm)		Jan24/24	Severe 60 40 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ 20 0 ECZ ECZ ECZ ECZ ECZ ECZ ECZ ECZ	(ppm)	
Aluminum (ppm)		Jan24/24	40 Abnormal 20 0 EEZZ220 Chromium 40 Aswere	(ppm)	
Aluminum (ppm)		Jan24/24	Chromium	(ppm)	
Aluminum (ppm)			Chromium	(ppm)	
Aluminum (ppm)			Chromium	(ppm)	
Aluminum (ppm)			Chromium	(ppm)	
Severe Abnormal Copper (ppm)			50 40 Severe	(ppm)	
Abnormal Copper (ppm)			40 - Severe		
Copper (ppm)		mag			
Copper (ppm)			_ 30		
Copper (ppm)			20 - Abnormal		
Copper (ppm)			10		
Copper (ppm)			0		
Copper (ppm)		Jan24/24	Nov2/23		
		Jan	_		
Severe Pubnomman			Silicon (pp <sup>80</sup> T Severe	m)	
•					
			60		
-			Abnormal		
-			20		
		_	0		
Nov2/23		Jan24/24	Nov2/23		
		Jar		aar	
Viscosity @ 100°C			Base Numl	Jei	
Abnormal		KOH	10.0		
Base			80		
		er (mg	6.0		
Abnormal		Vumber (mg	8.0 - 6.0 - 4.0 -		
		Base Number (mg	8.0 6.0 4.0 2.0		
Nov2/23		Jan24/24 Base Number (mg	6.0		

Laboratory Sample No. Lab Number : 06147080 Tested : 15 Apr 2024 NEW BRUNSWICK, NJ Unique Number : 10977158 : 15 Apr 2024 - Sean Felton US 08901 Diagnosed Test Package : MOB 1 (Additional Tests: TBN) Contact: Anthony Cursi Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. acursi@millertransgroup.com \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (732)358-4027 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: (732)400-8475

Report Id: MILNEW [WUSCAR] 06147080 (Generated: 04/15/2024 21:41:29) Rev: 1

Contact/Location: Anthony Cursi - MILNEW