

# **OIL ANALYSIS REPORT**

Sample Rating Trend



NORMAL



Machine Id Blue Bird 4555

Component
Diesel Engine

Diesei Engine

PETRO CANADA DURON SHP 10W30 (18 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

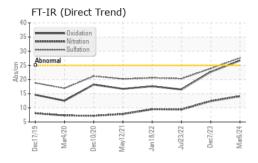
## **Fluid Condition**

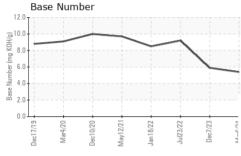
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

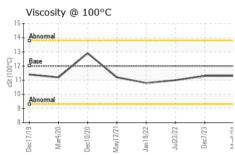
Sample Date   Client Info   16 Mar 2024   07 Dec 2023   23 Jul 2022							
Sample Date	SAMPLE INFORM	/ATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		PCA0091585	PCA0091698	PCA0045595
Oil Age         mls         Client Info         15297         12774         6115           Oil Changed	Sample Date		Client Info		06 Mar 2024	07 Dec 2023	23 Jul 2022
Oil Changed Sample Status         Client Info MoRMAL         Changed NORMAL         Changed NoEMANGE NoRMAL         Change NoBG         NEG         NEG	Machine Age	mls	Client Info		72045	56748	43974
Sample Status         method         imit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >90         72         55         26           Chromium         ppm         ASTM D5185m         >20         1         <1         <1         <1           Nickel         ppm         ASTM D5185m         >2         0         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         0         0           Lead         ppm         ASTM D5185m         >20         3         2         4         4         21         4         1         0         0         <1         0         0         1         4         1         0         0         <1         0         0         <1	Oil Age	mls	Client Info		15297	12774	6115
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0	Oil Changed		Client Info		Changed	Changed	0
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
Water Glycol         WC Method         >0.2         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >90         72         55         26           Chromium         ppm         ASTM D5185m         >20         1         <1         <1           Nickel         ppm         ASTM D5185m         >2         0         0         0           Silver         ppm         ASTM D5185m         >2         1         <1         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         1         0         0           Lead         ppm         ASTM D5185m         >40         <1         0         0           Copper         ppm         ASTM D5185m         >15         0         0         <1           Vanadium         ppm         ASTM D5185m         >1         0         0         <1           Vanadium         ppm         ASTM D5185m         0         <1	CONTAMINATI	ON	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         72         55         26           Chromium         ppm         ASTM D5185m         >20         1         <1         <1           Nickel         ppm         ASTM D5185m         >22         0         0         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         0           Lead         ppm         ASTM D5185m         >40         <1         0         0           Copper         ppm         ASTM D5185m         >40         <1         0         0           Vanadium         ppm         ASTM D5185m         >15         0         0         <1           Vanadium         ppm         ASTM D5185m         >10         0         0         0           Cadmium         ppm         ASTM D5185m         2         <1         1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         1         <1	WEAR METALS	S	method	limit/base	current	history1	history2
Nickel         ppm         ASTM D5185m         >2         0         0         0           Titanium         ppm         ASTM D5185m         >2         <1         <1         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         3         2         4           Lead         ppm         ASTM D5185m         >40         <1         0         0           Copper         ppm         ASTM D5185m         >40         <1         0         0           Vanadium         ppm         ASTM D5185m         >15         0         0         <1           Vanadium         ppm         ASTM D5185m         >15         0         0         <1           Vanadium         ppm         ASTM D5185m         >15         0         0         0           Cadmium         ppm         ASTM D5185m         0         <1         0         0           ADDTTVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         0	Iron	ppm	ASTM D5185m	>90	72	55	26
Titanium	Chromium	ppm	ASTM D5185m	>20	1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>2	0	0	0
Aluminum         ppm         ASTM D5185m         >20         3         2         4           Lead         ppm         ASTM D5185m         >40         <1         0         0           Copper         ppm         ASTM D5185m         >330         4         21         4           Tin         ppm         ASTM D5185m         >15         0         0         <1           Vanadium         ppm         ASTM D5185m         <1         0         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         0         2           Boron         ppm         ASTM D5185m         0         <1         0         2           Boron         ppm         ASTM D5185m         0         <1         0         2           Barium         ppm         ASTM D5185m         0         <1         0         <1           Barium         ppm         ASTM D5185m         950         1068         924         889<	Titanium	ppm	ASTM D5185m	>2	<1	<1	0
Lead         ppm         ASTM D5185m         >40         <1	Silver	ppm	ASTM D5185m	>2			
Copper         ppm         ASTM D5185m         >330         4         21         4           Tin         ppm         ASTM D5185m         >15         0         0         <1           Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         1         2           Barium         ppm         ASTM D5185m         0         <1         0         2           Molybdenum         ppm         ASTM D5185m         0         <1         0         2           Magnesium         ppm         ASTM D5185m         0         1         0         <1           Magnesium         ppm         ASTM D5185m         950         1068         924         889           Calcium         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         1180         1420         1184         1207 <th>Aluminum</th> <th>ppm</th> <th>ASTM D5185m</th> <th>&gt;20</th> <th>3</th> <th>2</th> <th>4</th>	Aluminum	ppm	ASTM D5185m	>20	3	2	4
Tin         ppm         ASTM D5185m         >15         0         0         <1	Lead	ppm	ASTM D5185m	>40	<1	0	
Vanadium         ppm         ASTM D5185m         <1	Copper	ppm	ASTM D5185m	>330	4	21	4
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         2         <1         1         2           Barium         ppm         ASTM D5185m         0         <1         0         2           Molybdenum         ppm         ASTM D5185m         50         65         62         58           Manganese         ppm         ASTM D5185m         0         1         0         <1           Magnesium         ppm         ASTM D5185m         950         1068         924         889           Calcium         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5	Tin	ppm	ASTM D5185m	>15	0		
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         2         <1         1         2           Barium         ppm         ASTM D5185m         0         <1         0         2           Molybdenum         ppm         ASTM D5185m         50         65         62         58           Manganese         ppm         ASTM D5185m         0         1         0         <1           Magnesium         ppm         ASTM D5185m         950         1068         924         889           Calcium         ppm         ASTM D5185m         1050         1230         1025         1026           Phosphorus         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m <td< th=""><th>Vanadium</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>&lt;1</th><th>0</th><th>0</th></td<>	Vanadium	ppm	ASTM D5185m		<1	0	0
Boron         ppm         ASTM D5185m         2         <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         0         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         50         65         62         58           Manganese         ppm         ASTM D5185m         0         1         0         <1	Boron	ppm	ASTM D5185m	2	<1	1	2
Manganese         ppm         ASTM D5185m         0         1         0         <1	Barium	ppm	ASTM D5185m	0	<1	0	2
Magnesium         ppm         ASTM D5185m         950         1068         924         889           Calcium         ppm         ASTM D5185m         1050         1230         1025         1026           Phosphorus         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         1180         1420         1184         1207           Sulfur         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         >20         5         6         6           Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM	Molybdenum	ppm	ASTM D5185m		65		
Calcium         ppm         ASTM D5185m         1050         1230         1025         1026           Phosphorus         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         1180         1420         1184         1207           Sulfur         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/:nm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/:nm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION         <	Manganese	ppm	ASTM D5185m	0	1	0	<1
Phosphorus         ppm         ASTM D5185m         995         1075         798         986           Zinc         ppm         ASTM D5185m         1180         1420         1184         1207           Sulfur         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm	Magnesium	ppm	ASTM D5185m			924	
Zinc         ppm         ASTM D5185m         1180         1420         1184         1207           Sulfur         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         3         0         2           Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414	Calcium	ppm	ASTM D5185m	1050	1230	1025	1026
Sulfur         ppm         ASTM D5185m         2600         3525         2394         3007           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         3         0         2           Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5							
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         3         0         2           Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5		ppm					
Silicon         ppm         ASTM D5185m         >25         5         5         4           Sodium         ppm         ASTM D5185m         3         0         2           Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5					3525		
Sodium         ppm         ASTM D5185m         3         0         2           Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         5         6         6           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5	Silicon	ppm	ASTM D5185m	>25	5		
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5	Sodium	ppm	ASTM D5185m		3	0	2
Soot %         %         *ASTM D7844 >6         1.1         0.8         0.4           Nitration         Abs/cm         *ASTM D7624 >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415 >30         27.6         23.9         20.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         26.7         22.7         16.5	Potassium	ppm	ASTM D5185m	>20	5	6	6
Nitration         Abs/cm         *ASTM D7624         >20         14.1         12.4         9.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         27.6         23.9         20.3           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5	Soot %	%	*ASTM D7844	>6	1.1	0.8	0.4
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2526.722.716.5	Nitration	Abs/cm	*ASTM D7624	>20	14.1	12.4	9.4
Oxidation         Abs/.1mm         *ASTM D7414         >25         26.7         22.7         16.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	27.6	23.9	20.3
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	26.7	22.7	16.5
<b>Base Number (BN)</b> mg KOH/g   ASTM D2896   <b>5.4</b> 5.9 9.2	Page Number (PNI)	ma K∩H/a	ASTM D2896		5.4	5.9	9.2



# **OIL ANALYSIS REPORT**



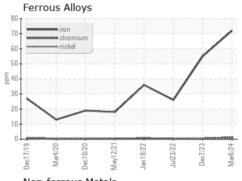


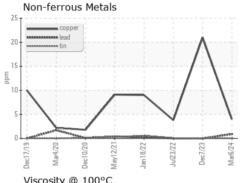


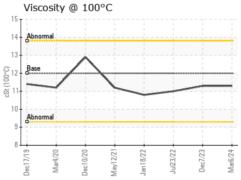
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

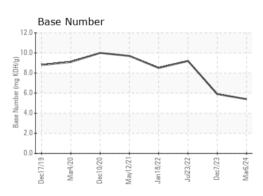
FLUID PROPI	ERHES	method				history2
Visc @ 100°C	cSt	ASTM D445	12.00	11.3	11.3	11.0

## **GRAPHS**













Certificate 12367

Laboratory Sample No. Lab Number : 06215321

: PCA0091585 Unique Number : 11088185

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

: 21 Jun 2024 : 21 Jun 2024 - Sean Felton 4525 North Alby Road

US 62035 Contact: Chad Ingold c.ingold@illinois-central.com T: (618)466-5400

ICSB370 - Alton

Godfrey, IL

Test Package : FLEET 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)