

OIL ANALYSIS REPORT





NORMAL

Machine Id **CATERPILLAR 349F 8369 (S/N LBZ220170)** Component **Diesel Engine** Fluid

PETRO CANADA DURON XL SYN BLEND 15W40 (--- GAL)

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Sample Number Client Info WC0862895 WC0790978 WC07 Sample Date Client Info 30 Oct 2023 10 May 2023 21 De Machine Age hrs Client Info 12473 11971 11433 Oil Age hrs Client Info 502 538 434 Oil Changed Client Info Changed Change Change Chang			ul2018 Oct2	018 Mar2019 Aug2019	Aug2020 Feb2021 Feb2022	Dec2022	
Sample Date Client Info 30 Oct 2023 10 May 2023 21 De Machine Age hrs Client Info 12473 11971 11433 Oil Age hrs Client Info 502 538 434 Oil Changed Client Info Changed Changed Changed Changed Sample Status Imit/base current History1 H Fuel WC Method >5 <1.0 <1.0 <1.1 Glycol WC Method >5 <1.0 <1.0 <1.1 Fuel WC Method >5 <1.0 <1.0 <1.1 Vickel ppm ASTM D5185m >5 <1 <1 <1 Irianium ppm ASTM D5185m >5 0 0 0 0 Silver ppm ASTM D5185m >22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 12473 11971 11433 Oil Age hrs Client Info 502 538 434 Oil Changed Client Info Changed	Sample Number		Client Info		WC0862895	WC0790978	WC075506
Oil Age hrs Client Info 502 538 434 Oil Changed Client Info Changed Changed<	Sample Date		Client Info		30 Oct 2023	10 May 2023	21 Dec 202
Oil Changed Sample Status Client Info Changed NORMAL NORMAL Changed Changed Clance NORMAL NORMA	Machine Age	hrs	Client Info		12473	11971	11433
Sample Status NORMAL NORMAL <tht< td=""><td>Oil Age</td><td>hrs</td><td>Client Info</td><td></td><th>502</th><td>538</td><td>434</td></tht<>	Oil Age	hrs	Client Info		502	538	434
CONTAMINATION method limit/base current history1 hi Fuel WC Method >5 <1.0	Oil Changed		Client Info		Changed	Changed	Changed
Fuel WC Method >5 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 hi Iron ppm ASTM D5185m >85 31 34 14 Chromium ppm ASTM D5185m >5 0 0 0 Nickel ppm ASTM D5185m >5 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Copper ppm ASTM D5185m >40 2 <1 <1 <1 Vanadium ppm ASTM D5185m >5 0 <1 <1 <1 Vanadium ppm ASTM D5185m 1 0 2 4 Barium ppm ASTM D5185m 1 0 <1 <t< td=""><td>Sample Status</td><td></td><td></td><td></td><th>NORMAL</th><td>NORMAL</td><td>NORMAL</td></t<>	Sample Status				NORMAL	NORMAL	NORMAL
Glycol WC Method NEG NEG NE WEAR METALS method limit/base current history1 hi Iron ppm ASTM D5185m >85 31 34 14 Chromium ppm ASTM D5185m >5 c1 c1 c1 Nickel ppm ASTM D5185m >5 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 0 0 0 Copper ppm ASTM D5185m >20 0 0 0 Cadmium ppm ASTM D5185m >5 0 <1	CONTAMINATIO	N	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 h Iron ppm ASTM D5185m >85 31 34 14 Chromium ppm ASTM D5185m >5 <1	Fuel		WC Method	>5	<1.0	<1.0	<1.0
Iron ppm ASTM D5185m >85 31 34 14 Chromium ppm ASTM D5185m >5 <1	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >5 <1 <1 <1 <1 Nickel ppm ASTM D5185m >5 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 Aluminum ppm ASTM D5185m >25 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >5 0 0 0 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 0 0 0 Aluminum ppm ASTM D5185m >25 <1	Iron	ppm	ASTM D5185m	>85	31	34	14
Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >40 2 <1	Chromium	ppm	ASTM D5185m	>5	<1	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >40 2 <1	Nickel	ppm	ASTM D5185m	>5	0	0	0
Aluminum ppm ASTM D5185m >40 2 <1 <1 Lead ppm ASTM D5185m >25 <1	Titanium	ppm	ASTM D5185m	>2	0	0	0
Lead ppm ASTM D5185m >25 <1 3 1 Copper ppm ASTM D5185m >350 5 5 3 Tin ppm ASTM D5185m >5 0 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >350 5 5 3 Tin ppm ASTM D5185m >5 0 <1	Aluminum	ppm	ASTM D5185m	>40	2	<1	<1
Tin ppm ASTM D5185m >5 0 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 hi Boron ppm ASTM D5185m 1 0 2 4 Barium ppm ASTM D5185m 1 0 0 0 Molybdenum ppm ASTM D5185m 1 0 <1	Lead	ppm	ASTM D5185m	>25	<1	3	1
Tin ppm ASTM D5185m >5 0 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 hi Boron ppm ASTM D5185m 1 0 2 4 Barium ppm ASTM D5185m 1 0 0 0 Molybdenum ppm ASTM D5185m 1 0 <1	Copper		ASTM D5185m	>350	5	5	3
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 1 0 2 4 Barium ppm ASTM D5185m 1 0 0 0 Molybdenum ppm ASTM D5185m 1 0 <1 <1 0 Manganese ppm ASTM D5185m 100 <11 0 <1< <1 Magnesium ppm ASTM D5185m 1010 996 977 974 Calcium ppm ASTM D5185m 1070 1137 1256 1150 Phosphorus ppm ASTM D5185m 1070 1137 1259 133 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method <						<1	<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 1 0 2 4 Barium ppm ASTM D5185m 1 0 0 0 Molybdenum ppm ASTM D5185m 1 0 <1	Vanadium						
Boron ppm ASTM D5185m 1 0 2 4 Barium ppm ASTM D5185m 1 0 0 0 Molybdenum ppm ASTM D5185m 60 74 75 66 Manganese ppm ASTM D5185m 1 0 <1	Cadmium		ASTM D5185m			0	0
Barium ppm ASTM D5185m 1 0 0 0 Molybdenum ppm ASTM D5185m 60 74 75 66 Manganese ppm ASTM D5185m 1 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 74 75 66 Manganese ppm ASTM D5185m 1 0 <1	Boron	ppm	ASTM D5185m	1	0	2	4
Manganese ppm ASTM D5185m 1 0 <1 <1 Magnesium ppm ASTM D5185m 1010 996 977 974 Calcium ppm ASTM D5185m 1070 1137 1256 119 Phosphorus ppm ASTM D5185m 1070 1137 1256 119 Zinc ppm ASTM D5185m 1150 1015 938 104 Zinc ppm ASTM D5185m 1270 1291 1259 135 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7624 >20	Barium	ppm	ASTM D5185m	1	0	0	0
Manganese ppm ASTM D5185m 1 0 <1 <1 Magnesium ppm ASTM D5185m 1010 996 977 974 Calcium ppm ASTM D5185m 1070 1137 1256 115 Phosphorus ppm ASTM D5185m 1070 1137 1256 115 Phosphorus ppm ASTM D5185m 1150 1015 938 104 Zinc ppm ASTM D5185m 1270 1291 1259 138 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 3 3 Sodium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3	Molybdenum	ppm	ASTM D5185m	60	74	75	66
Magnesium ppm ASTM D5185m 1010 996 977 974 Calcium ppm ASTM D5185m 1070 1137 1256 115 Phosphorus ppm ASTM D5185m 1150 1015 938 104 Zinc ppm ASTM D5185m 1270 1291 1259 138 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >40 4 3 3 Sodium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/:m *ASTM D77415 >30 <td>-</td> <td></td> <td>ASTM D5185m</td> <td>1</td> <th>0</th> <td><1</td> <td><1</td>	-		ASTM D5185m	1	0	<1	<1
Calcium ppm ASTM D5185m 1070 1137 1256 1157 Phosphorus ppm ASTM D5185m 1150 1015 938 104 Zinc ppm ASTM D5185m 1270 1291 1259 135 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >40 4 3 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/m *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415<	-				996		974
Phosphorus ppm ASTM D5185m 1150 1015 938 104 Zinc ppm ASTM D5185m 1270 1291 1259 135 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >40 4 3 3 Sodium ppm ASTM D5185m >40 4 3 3 Potassium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/m *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1m *ASTM D7415 >30	-			1070		1256	1199
Zinc ppm ASTM D5185m 1270 1291 1259 138 Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m >40 4 3 Potassium ppm ASTM D5185m 20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7624 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21.	Phosphorus				-		1047
Sulfur ppm ASTM D5185m 2060 3183 3407 366 CONTAMINANTS method limit/base current history1 hi Silicon ppm ASTM D5185m >40 4 3 3 Sodium ppm ASTM D5185m >40 4 3 3 Potassium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1							1352
Silicon ppm ASTM D5185m >40 4 4 3 Sodium ppm ASTM D5185m 49 76 25 Potassium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1	-						3662
Sodium ppm ASTM D5185m 49 76 25 Potassium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1	CONTAMINANTS	3	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 28 37 10 INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.imm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1	Silicon	ppm	ASTM D5185m	>40	4	4	3
INFRA-RED method limit/base current history1 hi Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1	Sodium	ppm	ASTM D5185m		49	76	25
Soot % % *ASTM D7844 >3 0.5 0.6 0.4 Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1	Potassium	ppm	ASTM D5185m	>20	28	37	10
Nitration Abs/cm *ASTM D7624 >20 11.7 13.4 10. Sulfation Abs/.1mm *ASTM D7415 >30 23.7 26.0 21. FLUID DEGRADATION method limit/base current history1 history1	INFRA-RED		method	limit/base	current	history1	history
SulfationAbs/.1mm*ASTM D7415>3023.726.021.FLUID DEGRADATIONmethodlimit/basecurrenthistory1hi	Soot %	%	*ASTM D7844	>3	0.5	0.6	0.4
FLUID DEGRADATION method limit/base current history1 hi	Nitration	Abs/cm	*ASTM D7624	>20	11.7	13.4	10.4
	Sulfation	Abs/.1mm	*ASTM D7415	>30	23.7	26.0	21.0
Oxidation Abs/.1mm *ASTM D7414 >25 21.0 24.9 18.	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	21.0	24.9	18.0
Base Number (BN) mg KOH/g ASTM D2896 9.6 6.8 5.5 8.0	Base Number (BN)	mg KOH/g	ASTM D2896	9.6	6.8	5.5	8.0

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

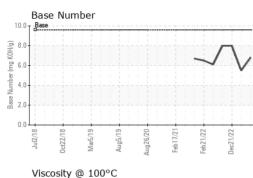
There is no indication of any contamination in the oil.

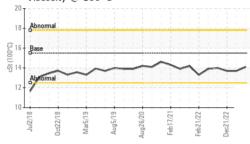
Fluid Condition

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

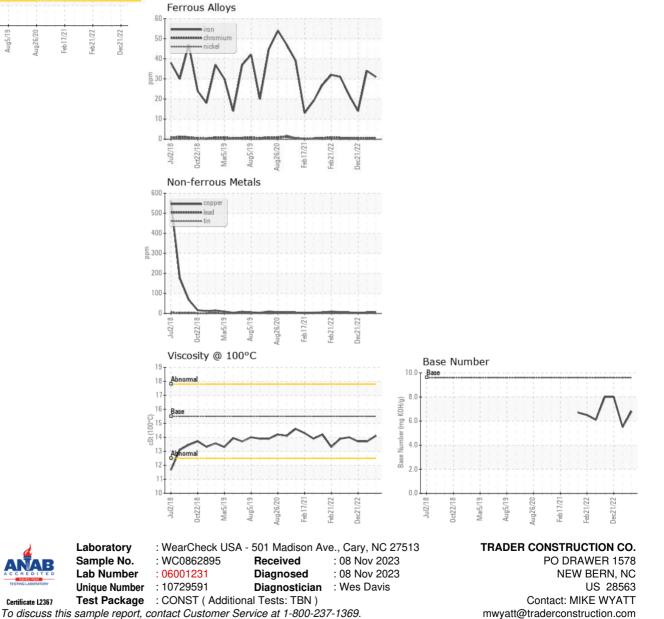


OIL ANALYSIS REPORT





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 PROPER	TIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.5	14.1	13.7	13.7
GRAPHS						





Certificate L2367

Report Id: TRANEW [WUSCAR] 06001231 (Generated: 11/08/2023 17:05:46) Rev: 1

* - 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)

Contact/Location: MIKE WYATT - TRANEW

T: (252)633-1399

F: (252)638-4871