

## **OIL ANALYSIS REPORT**

Sample Rating Trend

FUEL

X



CATERPILLAR R1600 SCP219 Component

**Diesel Engine** 

DIESEL ENGINE OIL SAE 15W40 (--- GAL)

DIAGNOSIS	SAMPLE INFOR	RMATION	method	limit/base	e current	history1	history2
Recommendation	Sample Number		Client Info		WC0820198	WC0840213	
We advise that you check the fuel injection system.	Sample Date		Client Info		18 Oct 2023	30 Sep 2023	
We recommend that you drain the oil from the	Machine Age	hrs	Client Info		1749	1585	
component if this has not already been done. We	Oil Age	hrs	Client Info		164	0	
recommend an early resample to monitor this condition.	Oil Changed		Client Info		Not Changd	Changed	
	Sample Status				SEVERE	SEVERE	
Wear	·	201	and the set	Paralt //s a sa		h to to an at	la la la ma
All component wear rates are normal.	CONTAMINATIO	JN	method	limit/base		history1	history2
Contamination There is a high amount of fuel present in the oil.	Glycol		WC Method		NEG	NEG	
Tests confirm the presence of fuel in the oil.	WEAR METALS		method	limit/base	e current	history1	history2
Fluid Condition	Iron	ppm	ASTM D5185(m)	>100	11	19	
Fuel is present in the oil and is lowering the	Chromium	ppm	ASTM D5185(m)	>20	<1	<1	
viscosity. The oil is no longer serviceable due to the	Nickel	ppm	ASTM D5185(m)	>2	0	0	
presence of contaminants.	Titanium	ppm	ASTM D5185(m)	>2	0	0	
	Silver	ppm	ASTM D5185(m)		<1	<1	
	Aluminum	ppm	ASTM D5185(m)		2	2	
	Lead	ppm	ASTM D5185(m)		4	8	
	Copper	ppm	ASTM D5185(m)		26	63	
	Tin	ppm	ASTM D5185(m)		3	6	
	Antimony	ppm	ASTM D5185(m)		0	0	
	Vanadium	ppm	ASTM D5185(m)		0	0	
		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			-		
	Bervllium	nnm	ASTM D5185(m)		0	0	
	Beryllium Cadmium	ppm mag	ASTM D5185(m) ASTM D5185(m)		0	0	
	Cadmium	ppm ppm	ASTM D5185(m)	limit/bases	0	0	
	Cadmium ADDITIVES	ppm	ASTM D5185(m) method	limit/base	0 e current	0 history1	 history2
	Cadmium ADDITIVES Boron	ppm	ASTM D5185(m) method ASTM D5185(m)	250	0 current 37	0 history1 30	
	Cadmium ADDITIVES Boron Barium	ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	250 10	0 current 37 <1	0 history1 30 <1	 history2
	Cadmium ADDITIVES Boron Barium Molybdenum	ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250	0 current 37 <1 36	0 history1 30 <1 35	 history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100	0 current 37 <1 36 0	0 history1 30 <1 35 0	history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450	0 current 37 <1 36 0 441	0 history1 30 <1 35 0 428	 history2  
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000	0 current 37 <1 36 0 441 1593	0 history1 30 <1 35 0 428 1550	 history2   
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150	0 current 37 <1 36 0 441 1593 696	0 history1 30 <1 35 0 428 1550 668	 history2   
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350	0 current 37 <1 36 0 441 1593 696 900	0 history1 30 <1 35 0 428 1550 668 798	 history2    
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) Method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150	0 current 37 <1 36 0 441 1593 696 900 1929	0 history1 30 <1 35 0 428 1550 668 798 1821	 history2      
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350	0 current 37 <1 36 0 441 1593 696 900	0 history1 30 <1 35 0 428 1550 668 798	 history2       
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) Method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350	0 current 37 <1 36 0 441 1593 696 900 1929 <1	0 history1 30 <1 35 0 428 1550 668 798 1821	 history2        -
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) <b>method</b> ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250	0 current 37 <1 36 0 441 1593 696 900 1929 <1	0 history1 30 <1 35 0 428 1550 668 798 1821 <1	 history2        -
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250 imit/base >25	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 <1 history1	 history2        -
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) <b>method</b> ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 <1 history1 6	 history2        -
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) <b>method</b> ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 8 1821 <1 <1 history1 6 3	 history2        -
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) <b>method</b> ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20 >5	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3 <1 8.9	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 ×1 6 3 <1 ↓ 9.9	 history2        history2  history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) AS	250 10 100 450 3000 1150 1350 4250 25 >25 >158 >20 >5 Limit/base	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3 <1 8.9 current	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 ×1 6 3 <1 ×1 € 9.9 history1	 history2       history2    history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm	ASTM D5185(m) AS	250 10 100 450 3000 1150 1350 4250 25 >25 >158 >20 >5 <b>limit/bass</b> >3	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3 <1 8.9 current 0	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 ×1 6 3 <1 ×1 0 9.9 ×1 0.1	 history2       history2    history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm         p	ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250 20 >25 >158 >20 >5 imit/base >3 >20	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3 <1 8.9 current 0 7.4	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 ×1 6 3 <1 9.9 history1 0.1 9.8	 history2        history2   history2  history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm	ASTM D5185(m) AS	250 10 100 450 3000 1150 1350 4250 20 >25 >158 >20 >5 imit/base >3 >20	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3 <1 8.9 current 0	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 ×1 6 3 <1 ×1 0 9.9 ×1 0.1	history2 history2 history2 history2 history2
	Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANT Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	250 10 100 450 3000 1150 1350 4250 20 >25 >158 >20 >5 imit/base >3 >20	0 current 37 <1 36 0 441 1593 696 900 1929 <1 current 8 3 <1 8.9 current 0 7.4 23.3	0 history1 30 <1 35 0 428 1550 668 798 1821 <1 ×1 6 3 <1 9.9 history1 0.1 9.8	 history2        history2   history2  history2

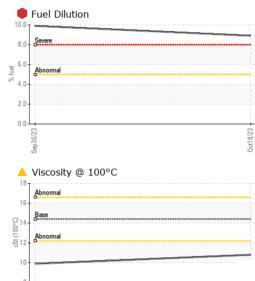
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Contact/Location: Tony Tees - KIR370KIR

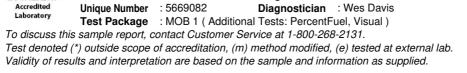


Sep30/23

## **OIL ANALYSIS REPORT**



VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	VLITE		
ellow Metal	scalar	Visual*	NONE	NONE		
Precipitate	scalar	Visual*	NONE	NONE		
Silt	scalar	Visual*	NONE	VLITE		
Debris	scalar	Visual*	NONE	NONE		
Sand/Dirt	scalar	Visual*	NONE	NONE		
ppearance	scalar	Visual*	NORML	NORML		
Ddor	scalar	Visual*	NORML	NORML	NORML	
mulsified Water	scalar	Visual*	>0.2	NEG	NEG	
Free Water	scalar	Visual*		NEG	NEG	
FLUID PROPERT	IES	method	limit/base	current	history1	history
/isc @ 100°C	cSt	ASTM D7279(m)	14.4	<b>10.8</b>	9.9	
GRAPHS						
Iron (ppm)				Lead (ppm)		
Severe			10	Severe		
1 1			- 8	) + @		
Abnormal			ud a	Abnormal		
- 0			- 4			
			2			
			723			
Sep 30/23			0ct18/23	Sep 30/23		
∽ Aluminum (ppm)				Chromium (	(mnm)	
			5		ppiny	
Severe			4	Severe		
Abnormal			ε3	)		
			E 2	Abnormal		
			10			
				) <u> </u>		
Sep 30/23			0ct18/23	Sep 30/23		
			00			
Copper (ppm)			8	Silicon (ppm	1)	
Severe						
•			6			
			u 4	)		
			2	Abnormal		
			_			
0/23 -			0ct18/23 -	0/23 -		
Sep30/23			0ct1	Sep 30/23		
Viscosity @ 100°C			10.	Fuel Dilutior	1	
Abnormal			10.	Severe		
Base						
Abnormal			a 6. 32 32 4.			
			2.			
//23						
Sep 30/23			0ct18/23	Sep 30/23		
~			_			
WearCheck - C8-11	75 Apple	by Line, Bur	lington, ON L	.7L 5H9	Agnico	Eagle Cana
NC0820198	Receive	d : 26 (	Oct 2023		overnment Rd. W, MA	CASSA COMPL
	Diagnos		Oct 2023		Kir	kland Lake, (
5669082	Diagnost		s Davis			CA P2N 3



CA P2N 3J1 Contact: Tony Tees tony.tees@agnicoeagle.com T: (705)567-5208 F: (705)567-5221

CALA

ISO 17025:2017

Laboratory

Sample No. Lab Number