

OIL ANALYSIS REPORT



GLYCOL



CUMMINS 178

Component

Rear Diesel Engine

ESSO XD-3 EXTRA 15W40 (--- GAL)

DIAGNOSIS

Recommendation

Check for low coolant level. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

All component wear rates are normal.

Contamination

Water treatment chemicals present, indicating slow coolant leak. Test for glycol is negative.

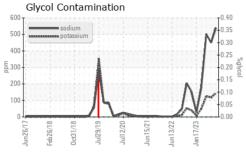
Fluid Condition

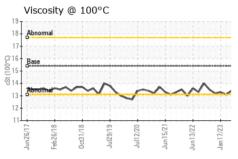
The condition of the oil is acceptable for the time in service (see recommendation).

n2017 Feb2016 Oct0016 Jul0013 Jul0020 Jun2021 Jun2022 Jun2023								
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2		
Sample Number		Client Info		WC0816420	WC0816565	WC0763104		
Sample Date		Client Info		15 Aug 2023	19 Jun 2023	05 May 2023		
Machine Age	kms	Client Info		0	0	0		
Oil Age	kms	Client Info		8779	9780	9010		
Oil Changed		Client Info		Changed	Changed	Changed		
Sample Status				ABNORMAL	ABNORMAL	ABNORMAL		
CONTAMINATION	N	method	limit/base	current	history1	history2		
Fuel		WC Method	>3.0	<1.0	<1.0	<1.0		
WEAR METALS		method	limit/base	current	history1	history2		
Iron	ppm	ASTM D5185(m)	>90	28	29	47		
Chromium	ppm	ASTM D5185(m)	>20	<1	<1	<1		
Nickel	ppm	ASTM D5185(m)	>2	<1	<1	<1		
Titanium	ppm	ASTM D5185(m)	>2	0	0	<1		
Silver	ppm	ASTM D5185(m)	>2	0	0	0		
Aluminum	ppm	ASTM D5185(m)	>20	3	3	4		
Lead	ppm	ASTM D5185(m)	>40	<1	<1	<1		
Copper	ppm	ASTM D5185(m)	>330	4	4	4		
Tin	ppm	ASTM D5185(m)	>15	0	0	<1		
Antimony	ppm	ASTM D5185(m)		<1	0	0		
Vanadium	ppm	ASTM D5185(m)		0	0	0		
Beryllium	ppm	ASTM D5185(m)		0	0	0		
Cadmium	ppm	ASTM D5185(m)		0	0	0		
ADDITIVES		method	limit/base	current	history1	history2		
Boron	ppm	ASTM D5185(m)		37	27	13		
Barium	ppm	ASTM D5185(m)		•	0	0		
Molybdenum				0	0	U		
Morybaonam	ppm	ASTM D5185(m)		5	15	53		
Manganese	ppm ppm	ASTM D5185(m) ASTM D5185(m)				-		
	• • • • • • • • • • • • • • • • • • • •	. ,		5	15	53		
Manganese	ppm	ASTM D5185(m)	3780	5 <1	15 <1	53 <1		
Manganese Magnesium	ppm ppm	ASTM D5185(m) ASTM D5185(m)	3780 1370	5 <1 62	15 <1 200	53 <1 751		
Manganese Magnesium Calcium	ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		5 <1 62 2125	15 <1 200 1916	53 <1 751 1420		
Manganese Magnesium Calcium Phosphorus	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1370	5 <1 62 2125 863	15 <1 200 1916 905	53 <1 751 1420 1068		
Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1370 1500	5 <1 62 2125 863 1014	15 <1 200 1916 905 1078	53 <1 751 1420 1068 1200		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1370 1500	5 <1 62 2125 863 1014 2965	15 <1 200 1916 905 1078 2801	53 <1 751 1420 1068 1200 2799		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1370 1500 3800	5 <1 62 2125 863 1014 2965 <1	15 <1 200 1916 905 1078 2801 <1	53 <1 751 1420 1068 1200 2799 <1		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) METHOD	1370 1500 3800 limit/base	5 <1 62 2125 863 1014 2965 <1	15	53 <1 751 1420 1068 1200 2799 <1 history2		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) METHOD METHOD ASTM D5185(m)	1370 1500 3800 limit/base >25	5 <1 62 2125 863 1014 2965 <1 current	15	53 <1 751 1420 1068 1200 2799 <1 history2 8		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) Method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1370 1500 3800 limit/base >25 >192	5 <1 62 2125 863 1014 2965 <1 current 10 ▲ 540	15 <1 200 1916 905 1078 2801 <1 history1 8	53 <1 751 1420 1068 1200 2799 <1 history2 8		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium	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)	1370 1500 3800 limit/base >25 >192	5 <1 62 2125 863 1014 2965 <1 current 10 ▲ 540 ▲ 145	15 <1 200 1916 905 1078 2801 <1 history1 8 450 118	53 <1 751 1420 1068 1200 2799 <1 history2 8 502 126		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) METHOD METHOD ASTM D5185(m)	1370 1500 3800 limit/base >25 >192 >20	5 <1 62 2125 863 1014 2965 <1 current 10 540 145 0.0	15 <1 200 1916 905 1078 2801 <1 history1 8 450 118 0.0	53 <1 751 1420 1068 1200 2799 <1 history2 8 502 126 0.0		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) METHOD ASTM D5185(m) ASTM D7922*	1370 1500 3800 limit/base >25 >192 >20	5	15 <1 200 1916 905 1078 2801 <1 history1 8 450 118 0.0 history1	53 <1 751 1420 1068 1200 2799 <1 history2 8 △ 502 △ 126 0.0 history2		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) METHOD METHOD ASTM D5185(m) ASTM D7922* METHOD ASTM D7944*	1370 1500 3800 limit/base >25 >192 >20 limit/base >6	5	15 <1 200 1916 905 1078 2801 <1 history1 8 450 118 0.0 history1 0.4	53 <1 751 1420 1068 1200 2799 <1 history2 8 △ 502 △ 126 0.0 history2 0.3		
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) METHOD METHOD ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D7844* ASTM D7624*	1370 1500 3800 limit/base >25 >192 >20 limit/base >6 >20	5 <1 62 2125 863 1014 2965 <1 current 10 540 145 0.0 current 0.4 11.0	15 <1 200 1916 905 1078 2801 <1 history1 8 450 118 0.0 history1 0.4 11.0	53 <1 751 1420 1068 1200 2799 <1 history2 8 △ 502 △ 126 0.0 history2 0.3 10.3		



OIL ANALYSIS REPORT





VISUAL		method	limit/base	current	history1	history2	
Emulsified Water	scalar	Visual*	>0.2	NEG	NEG	NEG	
Free Water	scalar	Visual*		NEG	NEG	NEG	
FLUID PROPERTIES		method	limit/base	current	history1	history2	
Visc @ 100°C	cSt	ASTM D7279(m)	15.4	13.9	13.4	13.4	
GRAPHS							

GRAPHS								
Iron (ppm)	Lea 90 T a a a a	ıd (pp	m)					
Smore	80 Seve	ere						
Severe De-	70					11:11		
	E 50							
Abnormal	30 - Abno	ormal						
	20							
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	10					11:11		H
Jun26/11/8 Oct31/18 Jul29/19 Jun15/21 Jun13/22 Jun13/22	Jun26/17	Feb26/18	Oct31/18	Jul29/19	Jul12/20	Jun15/21	Jun13/22	
Aluminum (ppm)		omiu		om)			,	
Severe	45 Seve					11777		
	35							
	30							
Abnormal	-20	ormal						H
	15					Ш		
	5							H
Jun26/18  Feb26/18  Jun29/19  Jun15/21  Jun13/22  Jan17/23	Jun26/17	Feb26/18	0ct31/18	Jul29/19	Jul12/20	Jun15/21	Jun13/22	2
Jund Doct3 Jull Jun1 Jun1	Jun2	Feb2	Oct3	Jul	Jul	Jun	Jun	-
Copper (ppm)	0.0	con (p	opm)					
Severe Abnormal	70 Seve	re						
	60							
	50 + E 40							
	30 - Abno	ormal				Щ.		11
	20			Α		1111		
	10	~		ハ	~	-	_	
	Jun26/17	Feb26/18	Oct31/18	Jul29/19	Jul12/20	Jun15/21	Jun13/22	
Jun 26/18	120	17			-			

500 400

200

100



CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No. Lab Number Unique Number : 5630932

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 : 02577872

12

: WC0816420

Received Diagnosed

: 24 Aug 2023 : 25 Aug 2023 Diagnostician : Kevin Marson Test Package : MOB 1 (Additional Tests: Glycol)

**CITY OF THUNDER BAY** AUTO MAINTENANCE STORES, 570 FORT WILLIAM ROAD THUNDER BAY, ON

CA P7B 2Z8 Contact: Sean Malcolm sean.malcolm@thunderbay.ca

To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

Contact/Location: Sean Malcolm - CITTHU

T: (807)684-2716

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0.20 g 0.15

0.10

-0.05 0.00