

OIL ANALYSIS REPORT

Sample Rating Trend



MINING ME-117 CATERPILLAR 980M KRS00356 Diesel Engine Fluid

SHELL RIMULA SUPER SAE 15W40 (--- GAL)

	ATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0919979	WC0920007	
Sample Date		Client Info		03 Jun 2024	01 Apr 2024	
Machine Age	hrs	Client Info		11913	11592	
Oil Age	hrs	Client Info		250	500	
Oil Changed		Client Info		N/A	Changed	
Sample Status				ABNORMAL	ABNORMAL	
	V	method	limit/base	current	history1	history2
Water		WC Method	>0.2	NEG	NEG	
Glycol		WC Method		NEG	NEG	
WEAR METALS		method	limit/base	current	history1	history
Iron	nnm	ASTM D5185m	>100	9	5	
Chromium	nnm	ASTM D5185m	>20	0	0	
Nickel	nnm	ASTM D5185m	>2	0	<1	
Titanium	ppm	ASTM D5185m	>2	0	0	
Silver	ppm	ASTM D5185m	>2	0	0	
Aluminum	ppm	ASTM D5185m	>25	1	2	
Aluminum	ppiii	ACTM DE105m	>20	.4	2	
Common	ррп		>40	<1	2	
Copper	ppm	ASTM D5185m	>330	2	2	
Tin V "	ppm	ASTM D5185m	>15	<1	<1	
Vanadium	ppm	ASTM D5185m		0	0	
Cadmium	ppm	ASTM D5185m		0	0	
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		40	37	
Barium	ppm	ASTM D5185m		<1	0	
Molybdenum	ppm	ASTM D5185m		36	36	
Manganese						
manganese	ppm	ASTM D5185m		<1	<1	
Magnesium	ppm ppm	ASTM D5185m ASTM D5185m		<1 451	<1 476	
Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	2840	<1 451 1454	<1 476 1598	
Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2840 1150	<1 451 1454 869	<1 476 1598 906	
Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2840 1150 1270	<1 451 1454 869 983	<1 476 1598 906 1075	
Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2840 1150 1270 2829	<1 451 1454 869 983 2994	<1 476 1598 906 1075 3288	
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method	2840 1150 1270 2829 limit/base	<1 451 1454 869 983 2994 current	<1 476 1598 906 1075 3288 history1	 history.
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	2840 1150 1270 2829 limit/base >25	<1 451 1454 869 983 2994 current 5	<1 476 1598 906 1075 3288 history1 3	 history.
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	2840 1150 1270 2829 limit/base >25	<1 451 1454 869 983 2994 current 5 3	<1 476 1598 906 1075 3288 history1 3 4	 history
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2840 1150 1270 2829 limit/base >25 >20	<1 451 1454 869 983 2994 current 5 3 <1	<1 476 1598 906 1075 3288 history1 3 4 <1	 history:
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2840 1150 1270 2829 limit/base >25 >20 >5	<1 451 1454 869 983 2994 <u>current</u> 5 3 <1 ▲ 4.2	<1 476 1598 906 1075 3288 history1 3 4 <1 ▲ 5.1	 history
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 method	2840 1150 1270 2829 limit/base >25 >20 >5 limit/base	<1 451 1454 869 983 2994 <u>current</u> 5 3 <1 ▲ 4.2 <u>current</u>	<1 476 1598 906 1075 3288 history1 3 4 <1 ▲ 5.1 history1	 history: history:
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm %	ASTM D5185m ASTM D3524 method	2840 1150 1270 2829 limit/base >25 >20 >5 limit/base >3	<1 451 1454 869 983 2994 <u>current</u> 5 3 <1 ▲ 4.2 <u>current</u> 0.2	<1 476 1598 906 1075 3288 history1 3 4 <1 ▲ 5.1 history1 0.2	 history. history. history.
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm %	ASTM D5185m ASTM D3524 *ASTM D7844	2840 1150 1270 2829 limit/base >25 >20 >5 limit/base >3 >20	<1 451 1454 869 983 2994 current 5 3 <1 ▲ 4.2 current 0.2 8.9	<1 476 1598 906 1075 3288 history1 3 4 <1 ▲ 5.1 history1 0.2 9.1	 history history.
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 *ASTM D7844 *ASTM D7844	2840 1150 1270 2829 limit/base >25 >20 >5 limit/base >3 >20 >30	<1 451 1454 869 983 2994 current 5 3 <1 4.2 current 0.2 8.9 22.0	<1 476 1598 906 1075 3288 history1 3 4 <1 ▲ 5.1 history1 0.2 9.1 22.0	 history. history. history.
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm % % Abs/tmm TION	ASTM D5185m ASTM D51854 *ASTM D7844 *ASTM D7844 *ASTM D7624	2840 1150 1270 2829 limit/base >25 >20 >5 limit/base >3 >20 >3 >20	<1 451 1454 869 983 2994 current 5 3 <1 ▲ 4.2 current 0.2 8.9 22.0 current	<1 476 1598 906 1075 3288 history1 3 4 <1 ▲ 5.1 history1 0.2 9.1 22.0 history1	 history: history: history:
Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA Oxidation	ppm ppm ppm ppm ppm ppm ppm ppm % % % Abs/tmm Abs/tmm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7415	2840 1150 1270 2829 limit/base >25 20 >5 limit/base >3 >20 >30 limit/base >25	<1 451 1454 869 983 2994 current 5 3 <1 ▲ 4.2 current 0.2 8.9 22.0 current 21.3	<1 476 1598 906 1075 3288 history1 3 4 <1 <i>5.1 history1 0.2 9.1 22.0 history1 21.8 </i>	 history: history: history: history:

DIAGNOSIS

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Area

Wear

All component wear rates are normal.

Contamination

Light fuel dilution occurring. No other contaminants were detected 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









White Metal	scalar	*Visual	NONE	NONE	NONE	
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	
Precipitate	scalar	*Visual	NONE	NONE	NONE	
Silt	scalar	*Visual	NONE	NONE	NONE	
Debris	scalar	*Visual	NONE	NONE	NONE	
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	
Appearance	scalar	*Visual	NORML	NORML	NORML	
Odor	scalar	*Visual	NORML	NORML	NORML	
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	
Free Water	scalar	*Visual		NEG	NEG	
FLUID PROPERT	TIES	method	limit/base	current	history1	histo
Visc @ 100°C	cSt	ASTM D445	15.5	10.3	▲ 10.2	
GRAPHS						
Ferrous Alloys						
8+						
nickel						
6-						
4						
a de la construcción de la constru						
1						
2						
2-						
2						
2			3/24			
2 0 42/1/1/dy			Jun3/24			
2 0 +Z/L/dy Non-forrous Mata			Jun3/24			
2 +2/Udy Non-ferrous Metal	s		Jun3/24			
Non-ferrous Metal	s		Jun3/24			
Non-ferrous Metal	s		Jun3/24			
Non-ferrous Metal	s		Jun3/24			
Non-ferrous Metal	s		Jun3/24			
Non-ferrous Metal	s		Jun3/24			
Non-ferrous Metal	5		Jun3/24			
Non-ferrous Metal	S		Jun3/24			
Non-ferrous Metal	S		Jun3/24			
Non-ferrous Metal	S		Jun3/24			
Non-ferrous Metal	S		24 second for the second			
Non-ferrous Metal	S		Jun3/24			
Non-ferrous Metal	S		Jun3/24			
Non-ferrous Metal	S		Jun3/24	Baco Numb		
Non-ferrous Metal	S		B2Eunr	Base Numbe	er.	
Non-ferrous Metal	S		Programme PCEung P25cung	Base Numbe	2r	
Non-ferrous Metal	S		420cmul	Base Numbe	er	
Non-ferrous Metal	S		12 10 10 10 10 10	Base Numbe	Pr	
Non-ferrous Metal	5		42/Enul 10 10 10 10 10 10 10 10 10 10 10 10 10	Base Numbe	Pr	
Non-ferrous Metal	S		۲۲ اسع ۲۲ اسع ۱۵ اسع ۱۵ اسع ۱۵ اسع ۱۵ اسع ۱۵ اسع ۱۵ اسع ۱۵ اسع ۱۹ اس ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹ اسع ۱۹	Base Numbe	er	
Non-ferrous Metal	S		Jun3/24	Base Numbe	er	
Non-ferrous Metal	S S		12 12 10 12 10 12 10 12 12 10 12 12 12 12 12 12 12 12 12 12	Base Numbe	er	
Non-ferrous Metal	S		4 12 12 12 10 10 12 12 10 10 12 12 12 12 12 12 12 12 12 12	Base Numbe	9r	
Viscosity @ 100°C	S		12 10 10 10 10 10 10 10 10 10 10	Base Numbe	er	
Viscosity @ 100°C	S		to (0)HON Base Municipal Science (1) 10 10 10 10 10 10 10 10 10 10 10 10 10	Base Numbe	er	
Viscosity @ 100°C	S		13/24 9/10/3/24 10/1	Base Numbe	er	
Viscosity @ 100°C	S		12 12 12 12 10 12 12 12 12 12 12 12 12 12 12	Base Numbe	er 	



Report Id: COVMEN [WUSCAR] 06201196 (Generated: 06/10/2024 08:29:31) Rev: 1

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