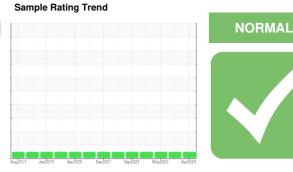


OIL ANALYSIS REPORT







CATERPILLAR 938K 137 (S/N SWL03584) Component Diesel Engine Fluid DIESEL ENGINE OIL SAE 15W40 (5 GAL)

SAMPLE INFORMATION meth

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.

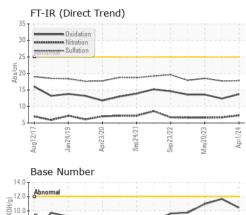
Fluid Condition

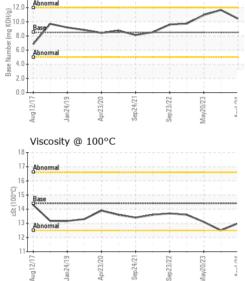
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORM		method	limit/base	current	history1	history2
Sample Number		Client Info		RW0005472	RW0004786	RW0004457
Sample Date		Client Info		01 Apr 2024	23 Sep 2023	20 May 2023
Machine Age	hrs	Client Info		7623	7293	7031
Oil Age	hrs	Client Info		330	262	259
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
-	_			Normize		
CONTAMINATIO	N	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<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	>100	20	16	12
Chromium	ppm	ASTM D5185m	>20	<1	<1	1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>2	0	0	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>25	17	11	12
Lead	ppm	ASTM D5185m	>40	0	0	0
Copper	ppm	ASTM D5185m	>330	<1	<1	<1
Tin	ppm	ASTM D5185m	>15	0	0	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 3	history1 6	history2 10
	ppm ppm					
Boron		ASTM D5185m	250	3	6	10
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	3 0	6 0	10 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	3 0 65	6 0 59	10 0 59
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	3 0 65 <1	6 0 59 <1	10 0 59 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	3 0 65 <1 1069	6 0 59 <1 837	10 0 59 <1 920
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	3 0 65 <1 1069 1292	6 0 59 <1 837 1048	10 0 59 <1 920 1063
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	3 0 65 <1 1069 1292 1214	6 0 59 <1 837 1048 957	10 0 59 <1 920 1063 1015
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350	3 0 65 <1 1069 1292 1214 1452	6 0 59 <1 837 1048 957 1138	10 0 59 <1 920 1063 1015 1234
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250	3 0 65 <1 1069 1292 1214 1452 4394	6 0 59 <1 837 1048 957 1138 3064	10 0 59 <1 920 1063 1015 1234 3727
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	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	250 10 100 450 3000 1150 1350 4250 limit/base	3 0 65 <1 1069 1292 1214 1452 4394 current	6 0 59 <1 837 1048 957 1138 3064 history1	10 0 59 <1 920 1063 1015 1234 3727 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	3 0 65 <1 1069 1292 1214 1452 4394 current 2	6 0 59 <1 837 1048 957 1138 3064 history1 3	10 0 59 <1 920 1063 1015 1234 3727 history2 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	3 0 65 <1 1069 1292 1214 1452 4394 current 2 <	6 0 59 <1 837 1048 957 1138 3064 history1 3 2	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20	3 0 65 <1 1069 1292 1214 1452 4394 current 2 < 2 <1 2	6 0 59 <1 837 1048 957 1138 3064 history1 3 2 2 2	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <1 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 Iimit/base >25 >158 >20 Iimit/base >3	3 0 65 <1 1069 1292 1214 1452 4394 <u>current</u> 2 <1 2 < <u>current</u> 0.4	6 0 59 <1 837 1048 957 1138 3064 history1 3 2 2 2 history1 0.7	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <1 <1 <1 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 Iimit/base >25 >158 >20 Iimit/base >3	3 0 65 <1 1069 1292 1214 1452 4394 current 2 <1 2 <1 2 current	6 0 59 <1 837 1048 957 1138 3064 history1 3 2 2 2 history1	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <1 <1 <1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >3 >20	3 0 65 <1 1069 1292 1214 1452 4394 <u>current</u> 2 <1 2 <1 2 <u>current</u> 0.4 7.3 17.8	6 0 59 <1 837 1048 957 1138 3064 history1 3 2 2 2 history1 0.7 6.7 17.7	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <1 <1 <1 history2 0.4 6.6 18.5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >3 >20 >30	3 0 65 <1 1069 1292 1214 1452 4394 <i>current</i> 2 <2 <1 2 1<br 2 <i>current</i> 0.4 7.3 17.8	6 0 59 <1 837 1048 957 1138 3064 history1 3 2 2 2 history1 0.7 6.7 17.7 history1	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <1 <1 <1 history2 0.4 6.6 18.5 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >3 >20	3 0 65 <1 1069 1292 1214 1452 4394 <u>current</u> 2 <1 2 <1 2 <u>current</u> 0.4 7.3 17.8	6 0 59 <1 837 1048 957 1138 3064 history1 3 2 2 2 history1 0.7 6.7 17.7	10 0 59 <1 920 1063 1015 1234 3727 history2 4 <1 <1 <1 history2 0.4 6.6 18.5



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 PROPERT		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.0	12.5	13.1
GRAPHS						
Iron (ppm)				Lead (ppm)		
250 Severe			100	Severe		
200 4 4			80	- 0		
Abnormal			60 Ed 40	Abnormal		
100 -			40			
50 -			20			
20 Jan	V21+	722	0	- 6U	/20	23
Aug 1 2/1 7 Jan 2 4/1 9 Apr 2 3/2 0	Sep24/21	Sep 23/22 May 20/23	Apr1/24	Aug 1 2/17 Jan 2 4/19	Apr23/20 Sep24/21	Sep 23/22 May20/23 Apr1/24
a i a Aluminum (ppm)	55	s Z		ج Chromium (µ		∞ ≥
50 _T 2 2			50			
40 - Severe			40	Severe		
E 30 - Abnormal			= 30			
Abnormal	\sim		E 20	Abnormal		
10		\backslash	10			
0			0		_	
Aug12/17 Jan24/19 Apr23/20	Sep24/21	Sep 23/22 May 20/23	Apr1/24	Aug 1 2/17 Jan 2 4/19	Apr23/20 Sep24/21	Sep 23/22 May20/23 Apr1/24
Aug	Sep	Sep	Aŗ	4		Sep May
Copper (ppm)				Silicon (ppm))	
400 ASKSEmal			80	Severe		
300-			60			
톨 200 -			틆 40			
100-			20	Abnormal		
0			0			
2/17 4/19	Sep24/21-	3/22 -	Apr1/24	2/17	4pr23/20 - Sep24/21 -	ep 23/22 - lay 20/23 - Apr1/24 -
Aug12/17 Jan24/19 Apr23/20	Sep 2	Sep 23/22 May 20/23	Apr	Aug 1 2/17 Jan 2 4/19	Apr23/20 Sep24/21	Sep 23/22 May20/23 Apr1/24
Viscosity @ 100°C				Base Numbe	r	
18 Abnormal			15.0	1 I I I I I I I I I I I I I I I I I I I		
16 -			0.0 Base Number (mg KOH/g)	Abnormal		\sim
Base Abnormal			B_10.0	Base		
			ې ۳ 5.0	Abnormal		
12-			Sase N			
	21-	22		17	2121	22
Aug12/17 Jan24/19 Apr23/20	Sep24/21	Sep 23/22 May 20/23	Apr1/24	Aug 12/17 Jan 24/19	Apr23/20 Sep24/21	Sep 23/22 May20/23 Apr1/24
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: WearCheck USA - 50 : RW0005472 : 06161012 : 10996435 : MOB 2	1 Madiso Rece i Teste Diagr	ived : 25 d : 26	r, NC 27513 5 Apr 2024 6 Apr 2024 6 Apr 2024 - W	es Davis		ITRACTING, INC. 4223 W POLK HART, MI US 49420 KK KARL BUTCHER
contact Customer Servi	ice at 1-8	800-237-1369	9.	Contac		ckcontracting.com
	7025 000	no of occess	litation			T. (001)070 5001

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)

Report Id: HALHAR [WUSCAR] 06161012 (Generated: 04/26/2024 14:38:15) Rev: 1

Certificate L2367

Laboratory Sample No. Lab Number Unique Number Test Package

Contact/Location: DAN HALLACK KARL BUTCHER - HALHAR

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