

# **OIL ANALYSIS REPORT**

Sample Rating Trend

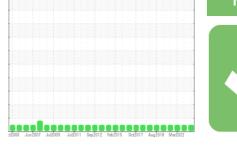




Machine Id **CATERPILLAR D5M 309 (S/N 3CR1998)** Component **Diesel Engine** Fluid

DIESEL ENGINE OIL SAE 15W40 (6 GAL)

SAMPLE INFORMATION method





### 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

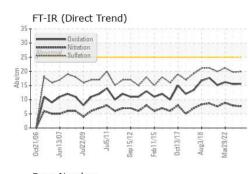
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

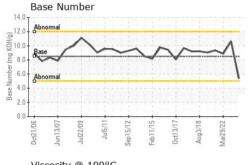
		methoa	iimii/base	current	nistory i	nistory2
Sample Number		Client Info		RW0005154	RW0004333	RW0003164
Sample Date		Client Info		18 Apr 2024	01 Feb 2023	29 Mar 2022
Machine Age	hrs	Client Info		8489	8237	8064
Oil Age	hrs	Client Info		252	173	212
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
						-
CONTAMINATION	۷	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	ourropt	bioton/1	history?
				current	history1	history2
Iron	ppm	ASTM D5185m	>100	7	8	10
Chromium	ppm	ASTM D5185m	>20	0	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	0	<1
Titanium	ppm	ASTM D5185m	>2	0	0	<1
Silver	ppm	ASTM D5185m	>2	0	0	<1
Aluminum	ppm	ASTM D5185m	>25	2	<1	4
Lead	ppm	ASTM D5185m	>40	0	<1	2
Copper	ppm	ASTM D5185m	>330	0	<1	1
Tin	ppm	ASTM D5185m	>15	<1	<1	1
Antimony	ppm	ASTM D5185m				
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	<1
				-		
ADDITIVES		method	limit/base	current	history1	history2
	ppm		limit/base 250	current 24		history2 99
ADDITIVES	ppm	method	250		history1	
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185m	250 10	24 <1	history1 12	99
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	250	24 <1 65	history1 12 0 64	99 0 71
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	24 <1 65 <1	history1 12 0	99 0
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	24 <1 65	history1 12 0 64 <1 847	99 0 71 <1 341
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	24 <1 65 <1 859 1249	history1 12 0 64 <1	99 0 71 <1 341 2201
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	24 <1 65 <1 859 1249 1114	history1 12 0 64 <1 847 1150 1038	99 0 71 <1 341 2201 1181
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	24 <1 65 <1 859 1249	history1 12 0 64 <1 847 1150	99 0 71 <1 341 2201
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250	24 <1 65 <1 859 1249 1114 1258 3719	history1 12 0 64 <1 847 1150 1038 1190 2993	99 0 71 <1 341 2201 1181 1520 3677
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	method 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	24 <1 65 <1 859 1249 1114 1258 3719 current	history1 12 0 64 <1 847 1150 1038 1190 2993 history1	99 0 71 <1 341 2201 1181 1520 3677 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25	24 <1 65 <1 859 1249 1114 1258 3719 current 3	history1           12           0           64           <1           847           1150           1038           1190           2993           history1           4	99 0 71 <1 341 2201 1181 1520 3677 history2 5
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2	history1           12           0           64           <1           847           1150           1038           1190           2993           history1           4           0	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25	24 <1 65 <1 859 1249 1114 1258 3719 current 3	history1           12           0           64           <1           847           1150           1038           1190           2993           history1           4	99 0 71 <1 341 2201 1181 1520 3677 history2 5
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2	history1           12           0           64           <1           847           1150           1038           1190           2993           history1           4           0	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2 0 current 0.3	history1         12         0         64         <1         847         1150         1038         1190         2993         history1         4         0         1         history1         0         1         0.3	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2 2 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >158 >20 <b>imit/base</b>	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2 0 0	history1         12         0         64         <1         847         1150         1038         1190         2993         history1         4         0         1         wistory1	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2 <1 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Zinc Sulfur CONTAMINANTS Silicon Silicon Sodium Potassium INFRA-RED Soot %	ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>Iimit/base</b> >25 >158 >20 <b>Iimit/base</b> >3	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2 0 current 0.3	history1         12         0         64         <1         847         1150         1038         1190         2993         history1         4         0         1         history1         0         1         0.3	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2 <1 ×1 history2 0.4
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >158 >20 <b>imit/base</b> >3 >20	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2 0 current 0.3 7.7	history1           12           0           64           <1           847           1150           1038           1190           2993           history1           4           0           1           history1           0.3           7.9	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2 2 <1 history2 0.4 8.9
ADDITIVES 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	method           ASTM D5185m           ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >158 >20 <b>imit/base</b> >3 >20 >3 >20	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2 0 current 0.3 7.7 19.9	history1         12         0         64         <1         847         1150         1038         1190         2993         history1         4         0         1         history1         0         1         0.3         7.9         19.7	99 0 71 <1 341 2201 1181 1520 3677 <b>history2</b> 5 2 <1 <b>bistory2</b> 0.4 8.9 21.2
ADDITIVES 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	method           ASTM D5185m           ASTM D7185M           ASTM D7844           *ASTM D7624           *ASTM D7415           method	250 10 100 450 3000 1150 1350 4250 20 25 >158 >20 >20 >30 >30 imit/base	24 <1 65 <1 859 1249 1114 1258 3719 current 3 2 0 current 0.3 7.7 19.9 current	history1         12         0         64         <1         847         1150         1038         1190         2993         history1         4         0         1         history1         0         1         0.3         7.9         19.7         history1	99 0 71 <1 341 2201 1181 1520 3677 history2 5 2 <1 history2 0.4 8.9 21.2 history2

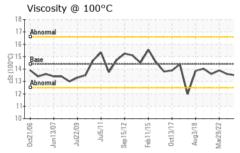
Contact/Location: DAN HALLACK KARL BUTCHER - HALHAR



# **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	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.5	13.6	13.9
GRAPHS						
Iron (ppm)				Lead (ppm)		
250			- 10	Severe		1910910101
200 - Severe			8			
E 150 100 - Abnormal			e d	Abnormal		
			4	Λ		
	- ^		2			
	12				11	17
0ct21/06 Jun13/07 Jul22/09 Jul5/11	Sep 15/12 Feb 11/15	Oct13/17	Mar29/22	0ct21/06 Jun13/07 Jul22/09	Jul5/11 Sep15/12 Feb11/15	0ct13/17 Aug3/18 - Mar29/22 -
,	з т	0 4	Z	· ·	0, 11	M M
Aluminum (ppm)			5	Chromium (p	pm)	
40 - Severe			4	Severe		
- 30 - Abaama						
Abnormal			en al construction de la constru	Abnormal		
10			1			
0	$\rightarrow$	/				
0ct21/06 Jun13/07 Jul22/09 Jul5/11	Sep 15/12 . Feb 11/15 .	Oct13/17. Aug3/18	Mar29/22	0ct21/06 Jun13/07 Jul22/09	Jul5/11 Sep15/12 Feb11/15	0ct13/17 Aug3/18 Mar29/22
Jul	Sep	Aug	Mará	Jun Jul	Ju Sepi	Oct <sup>1</sup> Aug Mará
Copper (ppm)				Silicon (ppm)		
			8	<sup>0</sup> Severe		
300 -			6	0		
톱 200			E 4	0		
				Abnormal		
100-			2			
	12	118			112	17 18 22
0ct21/06 Jun13/07 Jul22/09 Jul5/11	Sep15/12 Feb11/15	Oct13/17	Mar29/22	0ct21/06 Jun13/07 Jul22/09	Jul5/11 Sep15/12 Feb11/15	0ct13/17 Aug3/18 Mar29/22
-		5	2	-		7 W
Viscosity @ 100°C			15.			
Abnormal			Base Number (mg KOH/g)	Abnormal		N 1 1 1 1 1 1 1 1
	$\sim$		B 10.	Base	~~~	m
Base Abnormal		MA	mber	Abnormal		1
12-		V	- In S.	u + <b>u</b>		
10			-+ 0.			<u> </u>
0ct21/06 Jun 13/07 Jul22/09 Jul5/11	Sep15/12 Feb11/15	Oct13/17. Aug3/18	Mar29/22	0ct21/06 Jun13/07 Jul22/09	Jul5/11 Sep15/12 Feb11/15	0ct13/17 Aug3/18 Mar29/22
Jun Jul	Sep	Aut	Mar	Jun Jul	J Sep	Oct Aur Mari
: WearCheck USA - 50	1 Madiso	on Ave., Car	y, NC 27513	HA	LLACK CON	TRACTING, INC.
: RW0005154	Rece	ived :1	0 May 2024			4223 W POLK
: 06176220	Teste		3 May 2024			HART, MI
: 11022273	Diag	nosed : 10	3 May 2024 - V			US 49420
: MOB 2		200 227 126	0	Contact		K KARL BUTCHER

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] 06176220 (Generated: 05/14/2024 04:04:27) Rev: 1

Certificate L2367

Laboratory

Sample No.

Lab Number

**Unique Number** Test Package :

Contact/Location: DAN HALLACK KARL BUTCHER - HALHAR

Page 2 of 2

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