

# **OIL ANALYSIS REPORT**

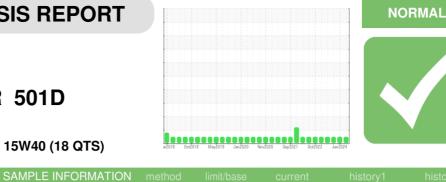
Sample Rating Trend



## Machine Id CATERPILLAR 501D

Diesel Engine

VALVOLINE ALLFLEET 15W40 (18 QTS)



DIAGNO	JOIO	

#### 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.

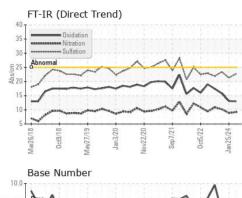
### Fluid Condition

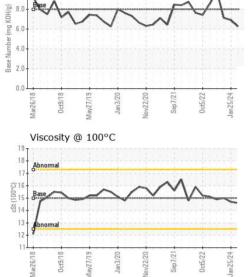
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Number		Client Info		RW0005097	RW0004600	RW0004601
Sample Date		Client Info		22 Apr 2024	25 Jan 2024	31 Oct 2023
Machine Age	hrs	Client Info		14868	14260	13710
Oil Age	hrs	Client Info		608	520	546
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	current	history1	history2
Iron	ppm	ASTM D5185m	>100	16	10	14
Chromium	ppm	ASTM D5185m		<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Titanium	ppm	ASTM D5185m		0	0	<1
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m	>25	1	2	2
Lead	ppm	ASTM D5185m	>40	<1	0	0
Copper	ppm	ASTM D5185m	>330	2	<1	3
Tin	ppm	ASTM D5185m	>15	0	0	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	<1
ADDITIVES		method				history2
ADDITIVES		methou	iiiiii/base	Current	nistory i	nistory2
Boron	ppm	ASTM D5185m	360	<1	3	20
	ppm ppm					
Boron		ASTM D5185m	360	<1	3	20
Boron Barium	ppm	ASTM D5185m ASTM D5185m	360 0.2	<1 0	3 0	20 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	360 0.2	<1 0 2	3 0 6	20 0 54
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	360 0.2 95	<1 0 2 <1	3 0 6 <1	20 0 54 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	360 0.2 95 284	<1 0 2 <1 11	3 0 6 <1 17	20 0 54 <1 38
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	360 0.2 95 284 2592	<1 0 2 <1 11 2694	3 0 6 <1 17 2409	20 0 54 <1 38 2269
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	360 0.2 95 284 2592 1148	<1 0 2 <1 11 2694 956	3 0 6 <1 17 2409 973	20 0 54 <1 38 2269 856
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	360 0.2 95 284 2592 1148 1372	<1 0 2 <1 11 2694 956 1217 4300	3 0 6 <1 17 2409 973 1190	20 0 54 <1 38 2269 856 1183
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	360 0.2 95 284 2592 1148 1372 5428	<1 0 2 <1 11 2694 956 1217 4300	3 0 6 <1 17 2409 973 1190 3796	20 0 54 <1 38 2269 856 1183 4123
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	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	360 0.2 95 284 2592 1148 1372 5428	<1 0 2 <1 11 2694 956 1217 4300 Current	3 0 6 <1 17 2409 973 1190 3796 history1	20 0 54 <1 38 2269 856 1183 4123 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	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	360 0.2 95 284 2592 1148 1372 5428	<1 0 2 <1 11 2694 956 1217 4300 current 3	3 0 6 <1 17 2409 973 1190 3796 history1 3	20 0 54 <1 38 2269 856 1183 4123 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 <b>method</b> ASTM D5185m	360 0.2 95 284 2592 1148 1372 5428 <b>limit/base</b> >25	<1 0 2 <1 11 2694 956 1217 4300 <u>current</u> 3 1 1	3 0 6 <1 17 2409 973 1190 3796 history1 3 1	20 0 54 <1 38 2269 856 1183 4123 history2 4 1
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	360 0.2 95 284 2592 1148 1372 5428 <b>limit/base</b> >25	<1 0 2 <1 11 2694 956 1217 4300 <u>current</u> 3 1 1	3 0 6 <1 17 2409 973 1190 3796 history1 3 1 1	20 0 54 <1 38 2269 856 1183 4123 history2 4 1 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	360 0.2 95 284 2592 1148 1372 5428 25428 25 25 >25 >20 Limit/base	<1 0 2 <1 11 2694 956 1217 4300 current 3 1 1 1 2	3 0 6 <1 17 2409 973 1190 3796 history1 3 1 1 1 history1	20 0 54 <1 38 2269 856 1183 4123 history2 4 1 2 <i>history2</i>
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	ASTM D5185m ASTM D5185m	360 0.2 95 284 2592 1148 1372 5428 <b>limit/base</b> >25 >20 <b>limit/base</b>	<1 0 2 <1 11 2694 956 1217 4300 <u>current</u> 3 1 1 1 <i>current</i> 1.7	3 0 6 <1 17 2409 973 1190 3796 history1 3 1 1 1 1 1 1.3	20 0 54 <1 38 2269 856 1183 4123 history2 4 1 2 <u>history2</u> 1.9
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	ASTM D5185m ASTM D5185m	360 0.2 95 284 2592 1148 1372 5428 <b>i</b> mit/base >25 20 <b>i</b> mit/base >3 >20	<1 0 2 <1 11 2694 956 1217 4300 <u>current</u> 3 1 1 1 1 <i>current</i> 1.7 9.2 22.7	3 0 6 <1 17 2409 973 1190 3796 history1 3 1 1 1 1 1 1 1 1 3 8.9	20 0 54 <1 38 2269 856 1183 4123 history2 4 1 2 history2 1.9 1.9 10.2
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	360 0.2 95 284 2592 1148 1372 5428 <b>Iinit/base</b> >25 20 <b>Iinit/base</b> >3 >20 >3 >20	<1 0 2 <1 11 2694 956 1217 4300 <u>current</u> 3 1 1 1 1 <i>current</i> 1.7 9.2 22.7	3 0 6 <1 17 2409 973 1190 3796 history1 3 1 1 1 1 1 1 1 1 1.3 8.9 21.3	20 0 54 <1 38 2269 856 1183 4123 <b>history2</b> 4 1 2 <b>history2</b> 1.9 10.2 23.4
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	360 0.2 95 284 2592 1148 1372 5428 <b>imit/base</b> >25 20 <b>imit/base</b> >3 >20 >30	<1 0 2 <1 11 2694 956 1217 4300 Current 3 1 1 1 Current 1.7 9.2 22.7 Current	3 0 6 <1 17 2409 973 1190 3796 history1 3 1 1 1 1 1.3 8.9 21.3 history1	20 0 54 <1 38 2269 856 1183 4123 history2 4 1 2 history2 1.9 10.2 23.4 history2



# **OIL ANALYSIS REPORT**





mqq

mdd

C+ /100°C1

Laboratory Sample No. Lab Number Unique Number Test Package

VISUAL		meth	od	limit/k	base	curr	ent	his	story1		histo	ory2
White Metal	scalar	*Visua	1	NONE		NONE		NOI	NE		NONE	=
Yellow Metal	scalar	*Visua	l	NONE		NONE		NO	NE		NONE	-
Precipitate	scalar	*Visua		NONE		NONE		NOI	NE		NONE	
Silt	scalar	*Visua		NONE		NONE		NON			NONE	
Debris	scalar	*Visua		NONE		NONE		NOI			NONE	
						-						
Sand/Dirt	scalar	*Visua		NONE		NONE		NO			NONE	
Appearance	scalar	*Visua		NORN		NORM		NO			NORN	
Odor	scalar	*Visua		NORN	IL	NORM		NO			NORN	ЛL
Emulsified Water	scalar	*Visua		>0.2		NEG		NEC			NEG	
Free Water	scalar	*Visua	l			NEG		NEC	G		NEG	
FLUID PROPER	TIES	meth	od	limit/k	base	curr	ent	his	story1		histo	ory2
Visc @ 100°C	cSt	ASTM [	D445	15.0		14.6		14.7	7		15.0	
GRAPHS												
Iron (ppm)					100	Lead (p	opm)					
200 - Severe					80	Severe						
150-					<sub>E</sub> 60	4.2.2.4						
100 - Abnormal			-	-	E 40	Abnormal						
50-					20							
	$ \longrightarrow $	-/\_		$\sim$	0				-			
Mar26/18 0ct9/18 May27/19	Jan3/20 Nov22/20	Sep7/21	0ct5/22	Jan 25/24		Mar26/18 0ct9/18	May27/19	Jan3/20	Vov22/20	Sep7/21	0ct5/22	Jan 25/24
Mar2 Oci May2	Jar Nov2	Sel	00	Jan2		Marź Oct	May2	Jan	Nov2	Sel	Oct	Jan2
Aluminum (ppm)						Chromi	um (pr	om)				
<sup>50</sup> T 3					50	13053051		nin:			10010	10101
40 - Severe					40	Severe				_		
30 Abnormal					E 30							
<sup>30</sup> Abnormal 20					ed 30 20	Abnormal						-
10-					10							
0		~~	-	-	0							_
Mar26/18 0ct9/18 May27/19	Jan3/20 Nov22/20	Sep7/21	0ct5/22	Jan 25/24		Mar26/18 0ct9/18	May27/19	Jan3/20	Vov22/20	Sep7/21	0ct5/22	Jan 25/24
Mari Oc May2	Ja Novź	S	00	Jan		Mari	Mayź	Jar	Noví	Se	0c	Janz
Copper (ppm)						Silicon	(ppm)					
500			111		80	Severe						
400 - Automa				- [ k -]	60							
300 - 50 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5					튭 40							
200						Abnormal						
100					20							
		5	2	4	0		6				2	4
Mar26/18 0ct9/18 May27/19	Jan3/20 Nov22/20	Sep7/21	0ct5/22	Jan 25/24		Mar26/18 0ct9/18	May27/19	Jan3/20	Nov22/20	Sep7/21	0ct5/22	Jan 25/24
2 2	2	00	5	Ца Г		Z		Ľ,	No	03	0	la
Viscosity @ 100°C	3				10.0	Base N	umber					
20					(B/H 0	Dase A				-	~/	
18 Abnormal					HOX Bu	ac	~	V		V	9	5
16 Base	$\sim$	$\sim v$	1		Base Number (mg KOH/g) 6.0	1.1.1.1						
14- Abnormal	111111				quinny 4.0							
12-*					Base 2.0							
	20	21-	22 +	24	0.0	18	6	20 -	20+	21-	22 -	24
Mar26/18 0ct9/18 May27/19	Jan3/20	Sep7/21	0ct5/22	Jan 25/24		Mar26/18 0ct9/18	May27/19	Jan3/20	Nov22/20	Sep7/21	0ct5/22	Jan 25/24
Ma	, Nc	0.51	95.11	şĻ		N	Ma	2	Nc	100		Ĵ
WearCheck USA - 50	1 Madica	n Avo	Carr	ר אר אי	512				~	חפח	ES FO	REGT
RW0005097	Rece			) May 20					U		20 BO	
06176254	Teste			3 May 20							ILLMA	
11022307		nosed		May 202		es Davis						19746
MOB 2	_						C	ontact	DAVI	E HOF		
antaat Custamar Car	ina at t (	000 007	1000	n				dovela	ornh -	ahara	a han	

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: CORHIL [WUSCAR] 06176254 (Generated: 05/13/2024 17:13:15) Rev: 1

Certificate L2367

Contact/Location: DAVE HORNBACHER - CORHIL

T: (989)884-2119

F: (989)742-4845

davehornbacher@yahoo.com