



OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL



Area
RIG 3
Machine Id
CATERPILLAR 3512 R3-G-01-NKL
Component
Diesel Engine
Fluid
DIESEL ENGINE OIL SAE 40 (--- GAL)

RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		KL0014013	KL0014067	KL0013117
Sample Date		Client Info		17 Jan 2024	28 Dec 2023	27 Oct 2023
Machine Age	days	Client Info		43803	45288	45225
Oil Age	days	Client Info		0	0	0
Filter Age	days	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Filter Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>100	3	3	0
Chromium	ppm	ASTM D5185m	>20	0	<1	0
Nickel	ppm	ASTM D5185m	>2	0	<1	0
Titanium	ppm	ASTM D5185m	>2	0	<1	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>25	3	2	4
Lead	ppm	ASTM D5185m	>40	0	<1	0
Copper	ppm	ASTM D5185m	>330	<1	1	0
Tin	ppm	ASTM D5185m	>15	0	<1	0
Vanadium	ppm	ASTM D5185m		<1	0	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

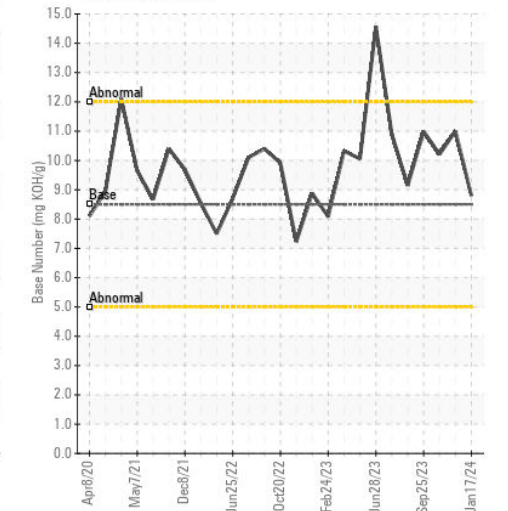
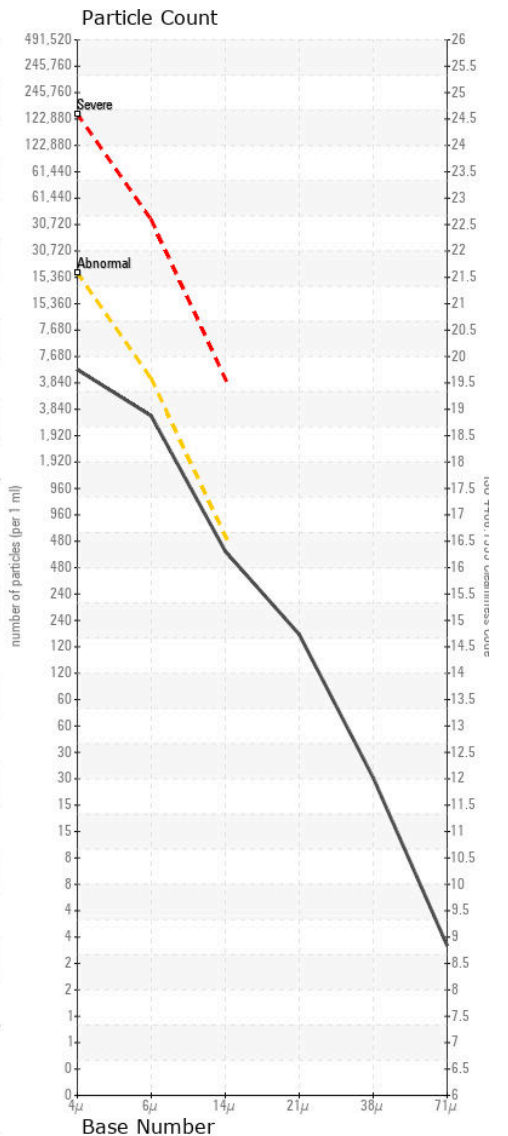
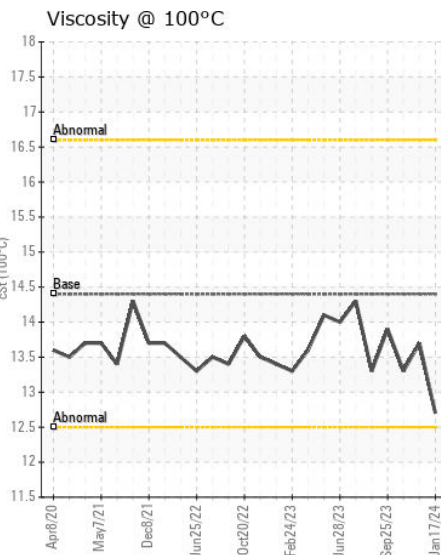
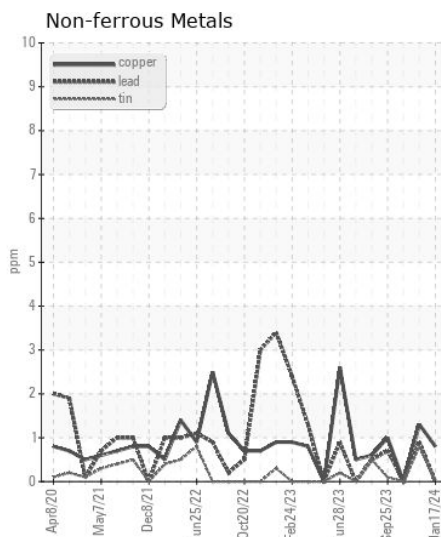
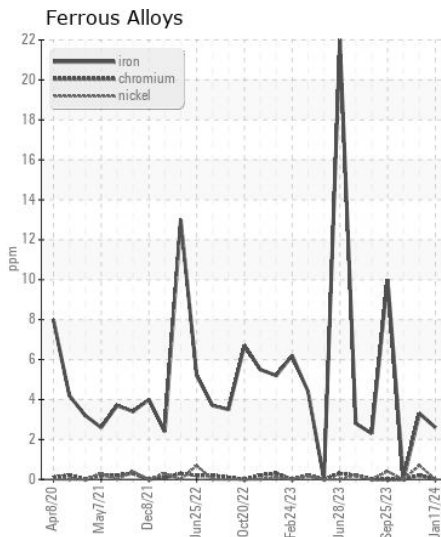
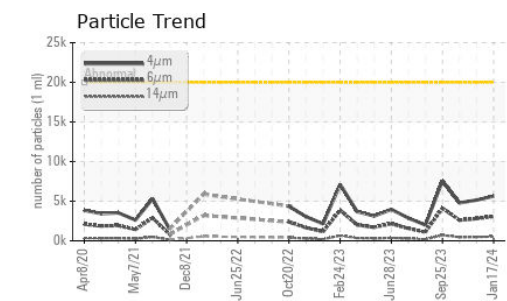
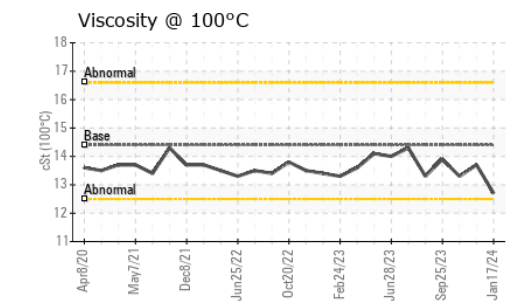
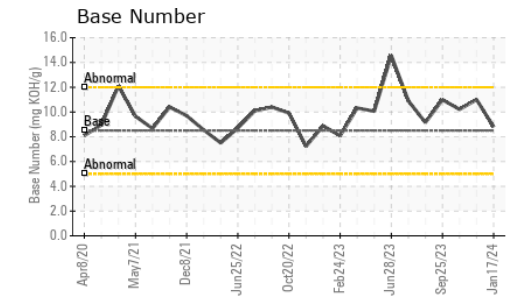
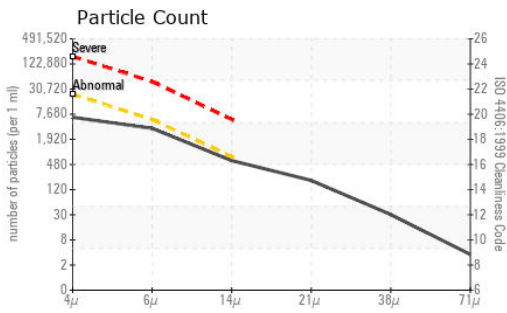
The amount and size of particulates present in the system are acceptable. There is no indication of any contamination in the oil.

Silicon	ppm	ASTM D5185m	>25	5	9	4
Potassium	ppm	ASTM D5185m	>20	0	2	3
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844	>3	0.1	0.1	0.1
Nitration	Abs/cm	*ASTM D7624	>20	6.0	6.2	5.8
Sulfation	Abs/.1mm	*ASTM D7415	>30	21.8	23.2	23.1
Particles >4µm		ASTM D7647	>20000	5637	5142	4785
Particles >6µm		ASTM D7647	>5000	3071	2801	2607
Particles >14µm		ASTM D7647	>640	523	477	444
Particles >21µm		ASTM D7647	>160	176	161	149
Particles >38µm		ASTM D7647	>40	27	25	23
Particles >71µm		ASTM D7647	>10	3	3	2
Oil Cleanliness		ISO 4406 (c)	>21/19/16	20/19/16	20/19/16	19/19/16
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

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.

Sodium	ppm	ASTM D5185m	>216	<1	0	2
Boron	ppm	ASTM D5185m	250	332	379	394
Barium	ppm	ASTM D5185m	10	0	0	0
Molybdenum	ppm	ASTM D5185m	100	121	130	125
Manganese	ppm	ASTM D5185m		<1	<1	0
Magnesium	ppm	ASTM D5185m	450	638	695	659
Calcium	ppm	ASTM D5185m	3000	1462	1562	1602
Phosphorus	ppm	ASTM D5185m	1150	705	696	686
Zinc	ppm	ASTM D5185m	1350	836	853	830
Sulfur	ppm	ASTM D5185m	4250	2566	2665	2440
Oxidation	Abs/.1mm	*ASTM D7414	>25	15.4	16.8	16.4
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.80	11.00	10.21
Visc @ 100°C	cSt	ASTM D445	14.4	12.7	13.7	13.3



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL0014013
Lab Number : 06083134
Unique Number : 10870579
Test Package : MOB 2 (Additional Tests: PrtCount)

Received : 07 Feb 2024
Tested : 08 Feb 2024
Diagnosed : 09 Feb 2024 - Sean Felton

CITADEL DRILLING
 7550 W 120
 ODESSA, TX
 US 79763

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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)

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