



OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL



Area
RIG 5
Machine Id
CATERPILLAR 3512 R5-G-02 NKL
Component
Diesel Engine
Fluid
{not provided} (--- GAL)

RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		KL0013842	KL0013190	KL0013982
Sample Date		Client Info		16 Feb 2024	11 Jan 2024	12 Dec 2023
Machine Age	days	Client Info		45338	45303	45272
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	ATTENTION

WEAR

All component wear rates are normal.

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

CONTAMINATION

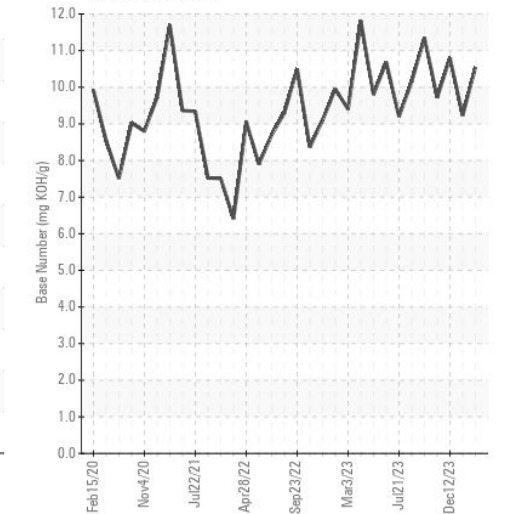
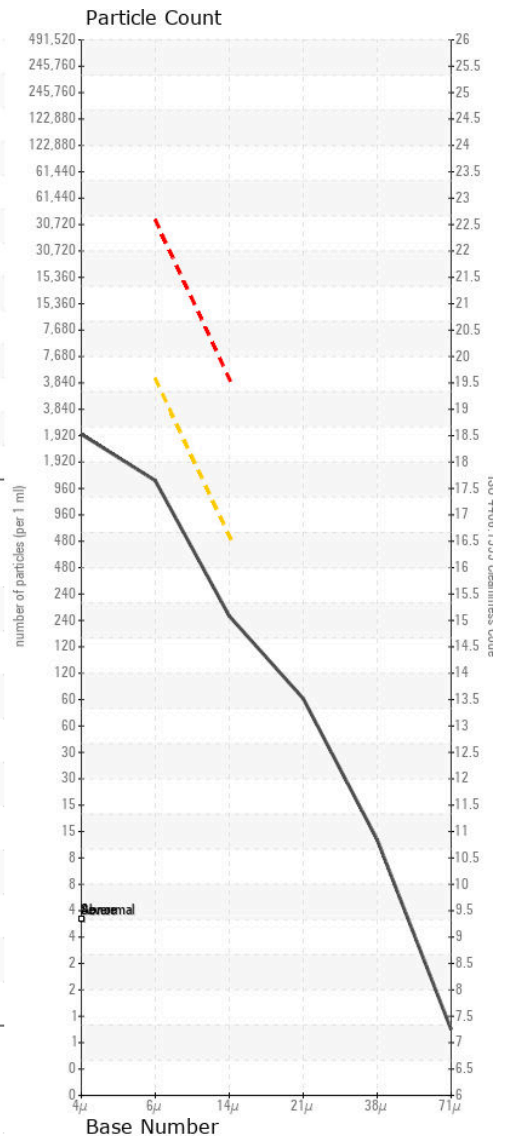
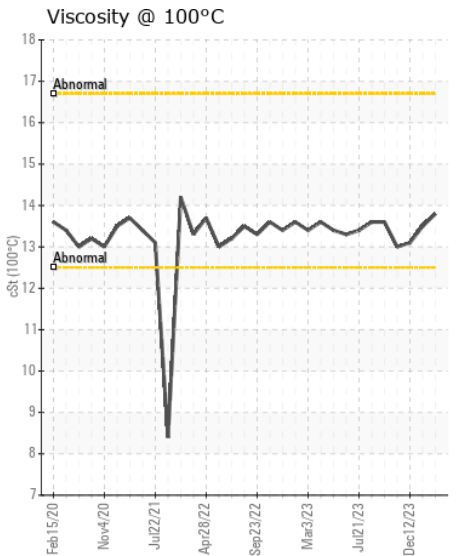
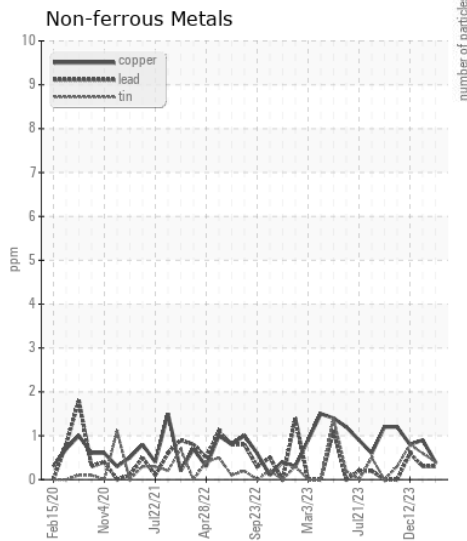
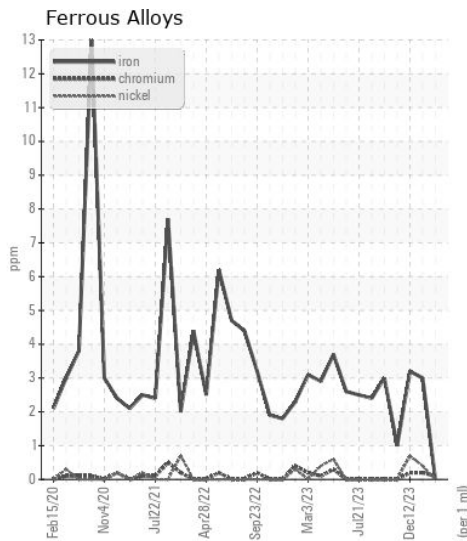
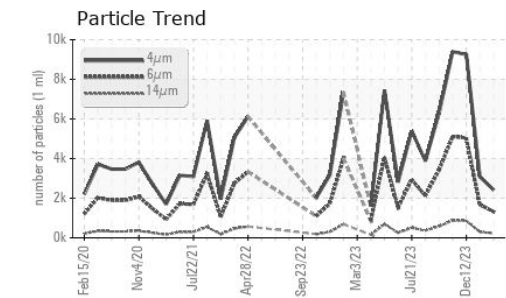
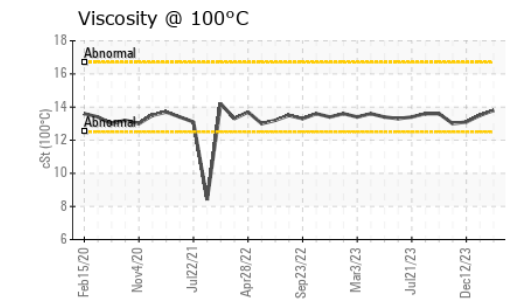
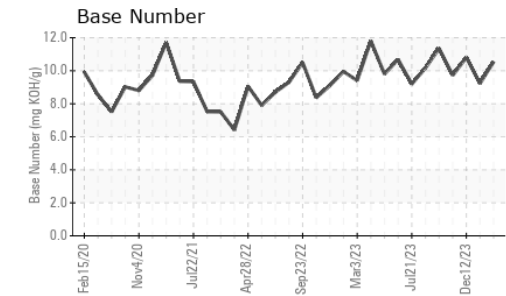
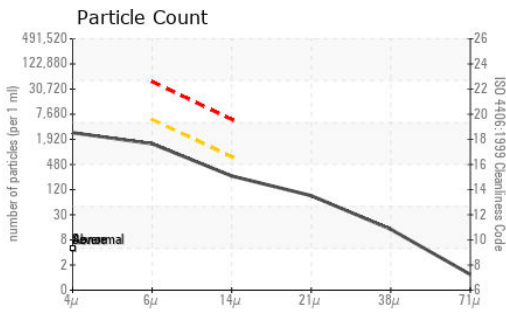
There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

Silicon	ppm	ASTM D5185m	>25	5	6	7
Potassium	ppm	ASTM D5185m	>20	2	2	2
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	5.1	5.6	6.4
Sulfation	Abs/.1mm	*ASTM D7415	>30	22.2	23.1	23.4
Particles >4µm		ASTM D7647		2418	3080	9248
Particles >6µm		ASTM D7647	>5000	1317	1678	5038
Particles >14µm		ASTM D7647	>640	224	286	857
Particles >21µm		ASTM D7647	>160	76	96	289
Particles >38µm		ASTM D7647	>40	12	15	45
Particles >71µm		ASTM D7647	>10	1	2	5
Oil Cleanliness		ISO 4406 (c)	>19/16	18/15	18/15	20/17
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		<1	0	0
Boron	ppm	ASTM D5185m		319	382	390
Barium	ppm	ASTM D5185m		0	0	0
Molybdenum	ppm	ASTM D5185m		108	124	133
Manganese	ppm	ASTM D5185m		<1	<1	<1
Magnesium	ppm	ASTM D5185m		666	652	714
Calcium	ppm	ASTM D5185m		1454	1458	1618
Phosphorus	ppm	ASTM D5185m		688	746	716
Zinc	ppm	ASTM D5185m		837	811	886
Sulfur	ppm	ASTM D5185m		2492	2710	2751
Oxidation	Abs/.1mm	*ASTM D7414	>25	15.5	16.1	17.0
Base Number (BN)	mg KOH/g	ASTM D2896		10.54	9.23	10.80
Visc @ 100°C	cSt	ASTM D445		13.8	13.5	13.1



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL0013842
Lab Number : 06105412
Unique Number : 10903642
Test Package : MOB 2 (Additional Tests: PrtCount)

Received : 29 Feb 2024
Tested : 06 Mar 2024
Diagnosed : 06 Mar 2024 - Jonathan Hester

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)

CITADEL DRILLING
 7550 W 120
 ODESSA, TX
 US 79763

Contact: MIKE COMBDEN
 mcombden@citadelldrilling.com

T: (780)955-5509

F: