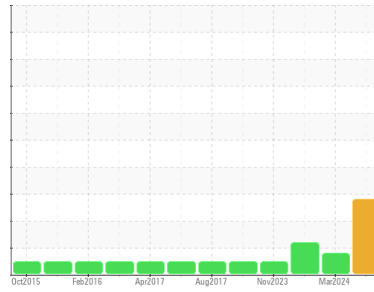


OIL ANALYSIS REPORT



Area
DE Samples - CAT LAB
 Machine Id
CATERPILLAR 980 HAUL LOADER 6583 (S/N JMS05055)
 Component
Diesel Engine
 Fluid
TULCO LUBSOIL CK-4 15W40 (--- GAL)

Sample Rating Trend



FUEL



DIAGNOSIS

Recommendation
 We advise that you check all areas where contaminants can enter the system. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. No corrective action is recommended at this time. Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor.

Wear
 All component wear rates are normal.

Contamination
 Calcium and/or magnesium levels higher than normal indicating possible contamination with cement dust, advise investigate. Light fuel dilution occurring. No other contaminants were detected in the oil.

Fluid Condition
 Additive levels indicate the addition of a different brand, or type of oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

SAMPLE INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		TO10002101	TO10003347	TO10003076
Sample Date	Client Info		28 May 2024	31 Mar 2024	08 Jan 2024
Machine Age	hrs	Client Info	35122	30863	34718
Oil Age	hrs	Client Info	404	305	539
Oil Changed	Client Info		Not Chngd	Not Chngd	Changed
Sample Status			ATTENTION	ABNORMAL	ABNORMAL

CONTAMINATION

	method	limit/base	current	history1	history2
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	36	14	25
Chromium	ppm	ASTM D5185m >20	<1	0	<1
Nickel	ppm	ASTM D5185m >2	<1	0	0
Titanium	ppm	ASTM D5185m >2	<1	0	0
Silver	ppm	ASTM D5185m >2	0	0	0
Aluminum	ppm	ASTM D5185m >25	4	<1	1
Lead	ppm	ASTM D5185m >40	4	<1	0
Copper	ppm	ASTM D5185m >330	4	2	4
Tin	ppm	ASTM D5185m >15	<1	<1	0
Vanadium	ppm	ASTM D5185m	<1	0	0
Cadmium	ppm	ASTM D5185m	0	0	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	4	9	9
Barium	ppm	ASTM D5185m	0	0	0
Molybdenum	ppm	ASTM D5185m 65	34	57	59
Manganese	ppm	ASTM D5185m	0	<1	<1
Magnesium	ppm	ASTM D5185m 1060	490	907	868
Calcium	ppm	ASTM D5185m 1140	770	1048	1049
Phosphorus	ppm	ASTM D5185m 1170	520	1037	1023
Zinc	ppm	ASTM D5185m 1230	836	1220	1218
Sulfur	ppm	ASTM D5185m 3130	1725	3374	2989

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m >25	4	2	2
Sodium	ppm	ASTM D5185m	10	2	0
Potassium	ppm	ASTM D5185m >20	4	0	0
Fuel	%	ASTM D3524 >5	4.9	5.7	4.3

INFRA-RED

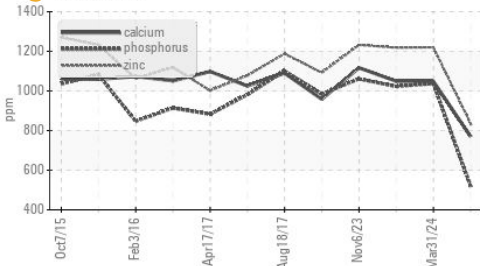
	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844 >3	0.4	0.4	0.5
Nitration	Abs/cm	*ASTM D7624 >20	7.5	7.1	7.5
Sulfation	Abs/.1mm	*ASTM D7415 >30	19.7	19.5	20.0

FLUID DEGRADATION

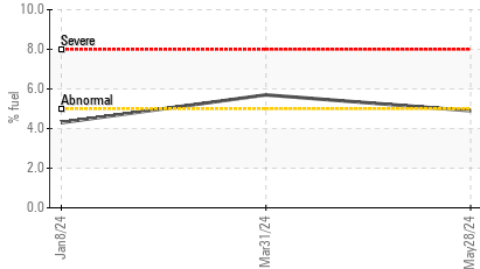
	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414 >25	14.8	14.7	15.0
Base Number (BN)	mg KOH/g	ASTM D2896 10.8	9.72	9.68	10.66

OIL ANALYSIS REPORT

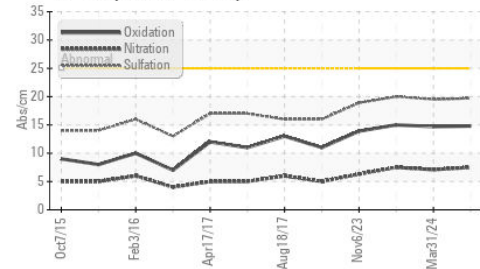
Additives



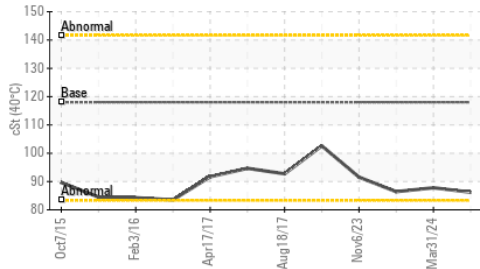
Fuel Dilution



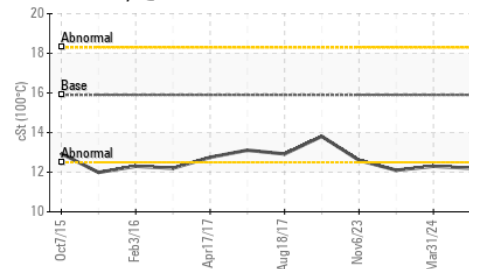
FT-IR (Direct Trend)



Viscosity @ 40°C



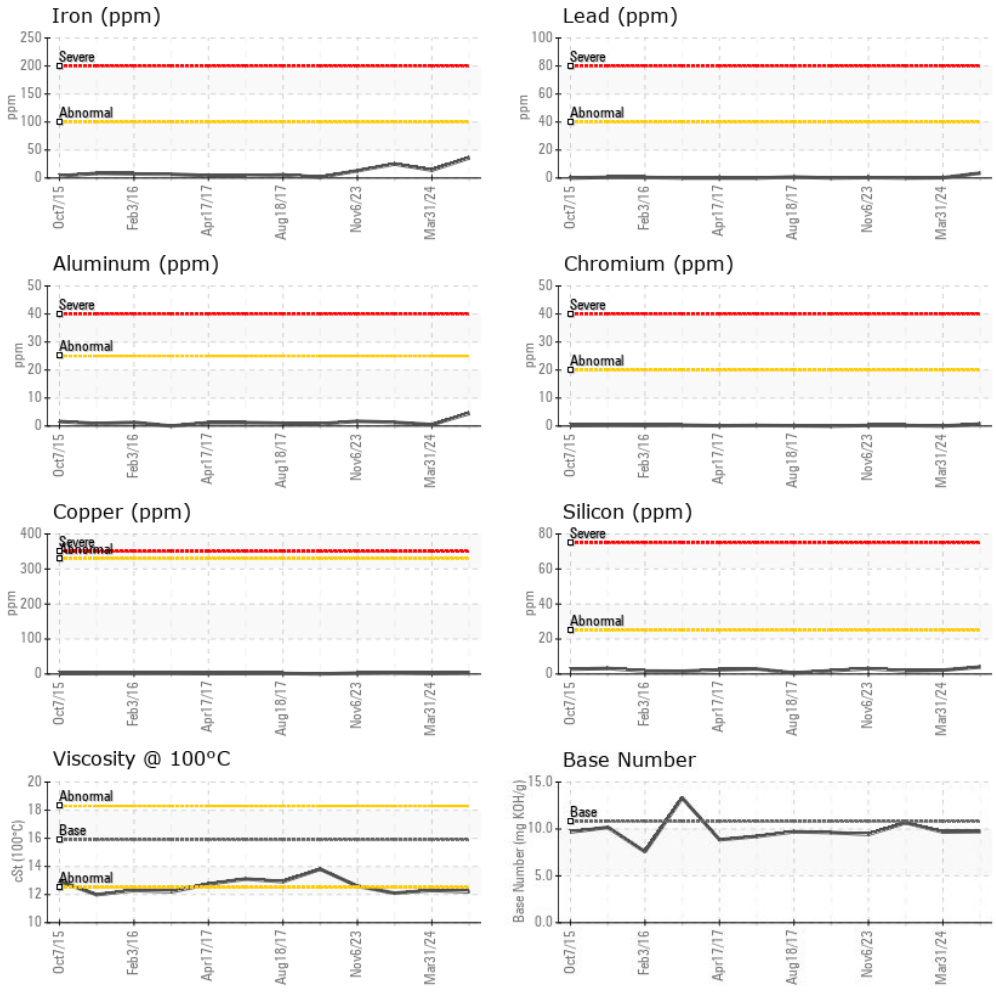
Viscosity @ 100°C



VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	118	86.2	87.8
Visc @ 100°C	cSt	ASTM D445	15.9	12.2	12.3
Viscosity Index (VI)	Scale	ASTM D2270	143	136	135

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : TO10002101

Lab Number : 06198340

Unique Number : 11060463

Test Package : MOB 2 (Additional Tests: KV40, PercentFuel, VI)

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)

Received : 03 Jun 2024

Tested : 05 Jun 2024

Diagnosed : 05 Jun 2024 - Wes Davis

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