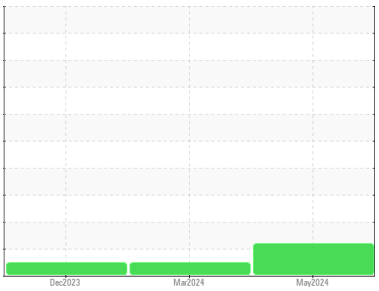
OIL ANALYSIS REPORT

Sample Rating Trend



WEAR

Area
MINING
Machine Id
ME-70 CATERPILLAR 772 KEX00168
Component
Diesel Engine
Fluid
SHELL RIMULA SUPER SAE 15W40 (12 GAL)

DIAGNOSIS

Recommendation
Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

Wear
The copper level is abnormal. In the absence of other significant wear metals, suspect copper due to sources other than wear (i.e. cooling core).

Contamination
Fuel content negligible. There is no indication of any contamination in the oil.

Fluid Condition
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0908946**	WC0901880	WC0864724
Sample Date		Client Info		**22 May 2024**	19 Mar 2024	14 Dec 2023
Machine Age	hrs	Client Info		**16729**	16442	16060
Oil Age	hrs	Client Info		**0**	0	0
Oil Changed		Client Info		**Changed**	Changed	Changed
Sample Status				**ABNORMAL**	NORMAL	NORMAL

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	**12**	10	10
Chromium	ppm	ASTM D5185m	>20	**<1**	1	0
Nickel	ppm	ASTM D5185m	>2	**1**	<1	0
Titanium	ppm	ASTM D5185m	>2	**<1**	<1	0
Silver	ppm	ASTM D5185m	>2	**<1**	0	0
Aluminum	ppm	ASTM D5185m	>25	**1**	3	3
Lead	ppm	ASTM D5185m	>40	**<1**	2	0
Copper	ppm	ASTM D5185m	>330	▲ **347**	2	<1
Tin	ppm	ASTM D5185m	>15	**<1**	1	0
Vanadium	ppm	ASTM D5185m		**0**	<1	0
Cadmium	ppm	ASTM D5185m		**<1**	<1	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		**0**	0	0
Barium	ppm	ASTM D5185m		**0**	<1	0
Molybdenum	ppm	ASTM D5185m		**43**	61	56
Manganese	ppm	ASTM D5185m		**0**	<1	0
Magnesium	ppm	ASTM D5185m		**499**	541	629
Calcium	ppm	ASTM D5185m	2840	**1056**	1638	1458
Phosphorus	ppm	ASTM D5185m	1150	**827**	1197	1024
Zinc	ppm	ASTM D5185m	1270	**942**	1279	1253
Sulfur	ppm	ASTM D5185m	2829	**2708**	3663	3286

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>25	**15**	5	3
Sodium	ppm	ASTM D5185m		**<1**	0	<1
Potassium	ppm	ASTM D5185m	>20	**5**	2	1
Fuel	%	ASTM D3524	>5	**0.7**	1.6	<1.0

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	>3	**0.1**	0.2	0.2
Nitration	Abs/cm	*ASTM D7624	>20	**4.9**	7.8	7.2
Sulfation	Abs/.1mm	*ASTM D7415	>30	**15.4**	18.8	19.0

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	**10.0**	15.4	14.7
Base Number (BN)	mg KOH/g	ASTM D2896	10.6	**6.6**	8.3	8.6

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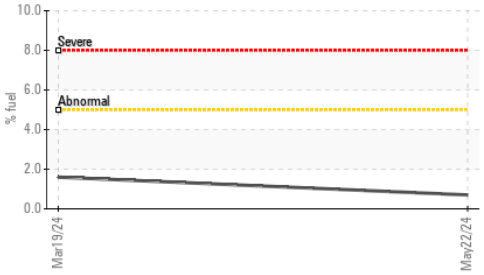
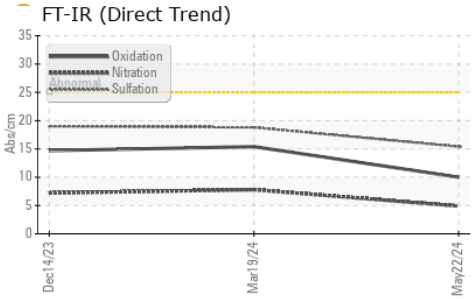
Fuel Dilution

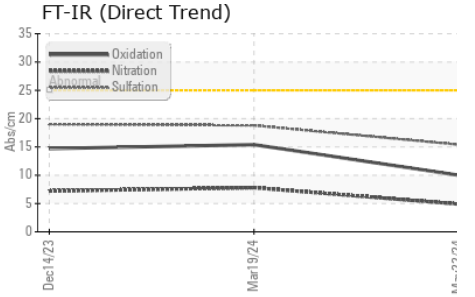


FT-IR (Direct Trend)

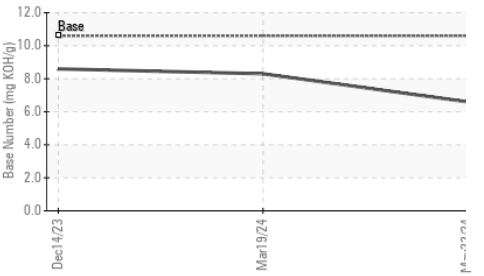


Fuel Dilution

FT-IR (Direct Trend)



Base Number

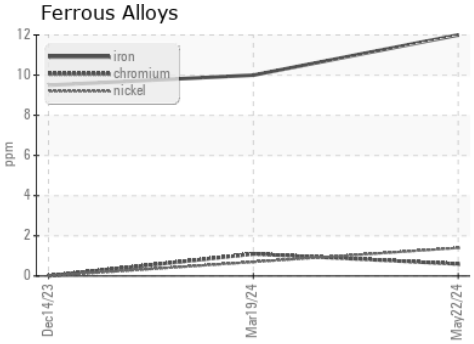


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt	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

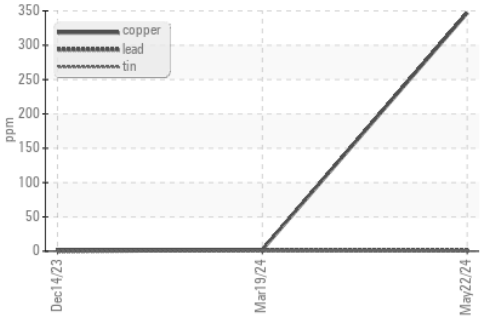
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.5	**8.07**	12.1	12.5

GRAPHS

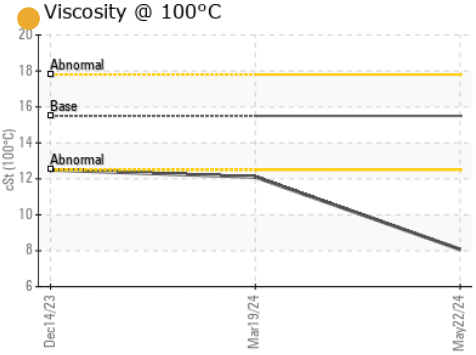
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 100°C



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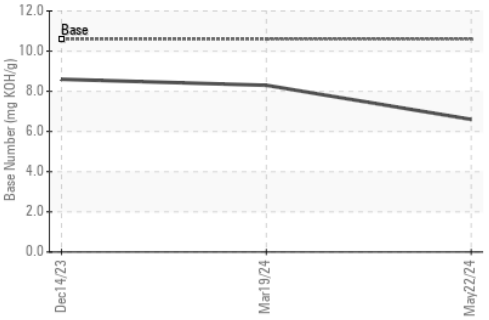

Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0908946 **Received** : 03 Jun 2024
Lab Number : 06197428 **Tested** : 06 Jun 2024
Unique Number : 11059551 **Diagnosed** : 07 Jun 2024 - Jonathan Hester
Test Package : CONST (Additional Tests: FuelDilution, PercentFuel, TBN)

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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