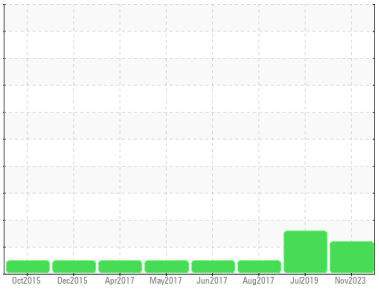
OIL ANALYSIS REPORT

Area
DE Samples - CAT LAB
Machine Id
CATERPILLAR 980H LOADER 6821 (S/N JMS06208)
Component
Diesel Engine
Fluid
TULCO LUBSOIL DIESEL TURBO CJ4 15W40 (--- GAL)

Sample Rating Trend



FUEL

DIAGNOSIS

Recommendation
We advise that you check the fuel injection system. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

Wear
All component wear rates are normal.

Contamination
There is a moderate amount of fuel present in the oil.

Fluid Condition
Fuel is present in the oil and is lowering the viscosity. The BN result indicates that there is suitable alkalinity remaining in the oil.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**TO10002867**	TO1005978	TO1006120
Sample Date		Client Info		**13 Nov 2023**	19 Jul 2019	21 Aug 2017
Machine Age	hrs	Client Info		**28310**	17758	12957
Oil Age	hrs	Client Info		**535**	300	350
Oil Changed		Client Info		**Changed**	Changed	Changed
Sample Status				**ABNORMAL**	ABNORMAL	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	**24**	27	20
Chromium	ppm	ASTM D5185m	>20	**<1**	<1	<1
Nickel	ppm	ASTM D5185m	>2	**0**	0	0
Titanium	ppm	ASTM D5185m	>2	**0**	<1	0
Silver	ppm	ASTM D5185m	>2	**0**	0	0
Aluminum	ppm	ASTM D5185m	>25	**<1**	<1	1
Lead	ppm	ASTM D5185m	>40	**1**	<1	<1
Copper	ppm	ASTM D5185m	>330	**4**	6	3
Tin	ppm	ASTM D5185m	>15	**0**	0	0
Antimony	ppm	ASTM D5185m		**---**	<1	0
Vanadium	ppm	ASTM D5185m		**0**	0	0
Cadmium	ppm	ASTM D5185m		**0**	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	1	**11**	6	28
Barium	ppm	ASTM D5185m		**0**	0	0
Molybdenum	ppm	ASTM D5185m	40	**56**	56	62
Manganese	ppm	ASTM D5185m		**<1**	<1	<1
Magnesium	ppm	ASTM D5185m	935	**904**	919	908
Calcium	ppm	ASTM D5185m	1234	**1059**	1121	1108
Phosphorus	ppm	ASTM D5185m	1089	**1019**	1027	1055
Zinc	ppm	ASTM D5185m	1090	**1225**	1172	1150
Sulfur	ppm	ASTM D5185m	3700	**2997**	2657	2057

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>25	**3**	4	2
Sodium	ppm	ASTM D5185m		**2**	2	1
Potassium	ppm	ASTM D5185m	>20	**0**	8	0
Fuel	%	ASTM D3524	>5	▲ **5.2**	▲ 4.7	<1.0

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	>3	**0.5**	0.6	0.3
Nitration	Abs/cm	*ASTM D7624	>20	**7.9**	8	6.
Sulfation	Abs/.1mm	*ASTM D7415	>30	**20.7**	19.9	17.

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	**15.4**	14.5	13.
Base Number (BN)	mg KOH/g	ASTM D2896	8.21	**8.78**	8.94	8.79

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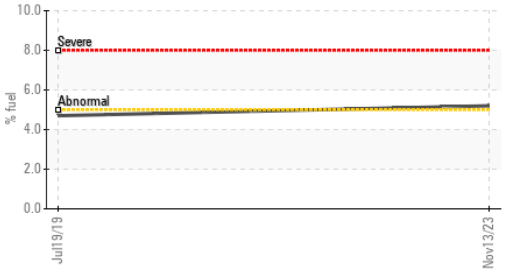
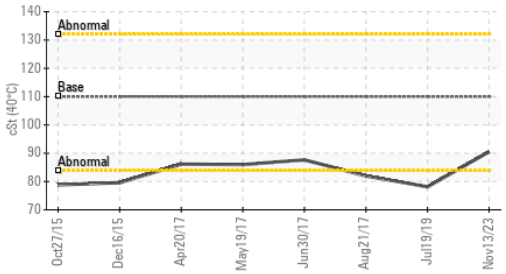
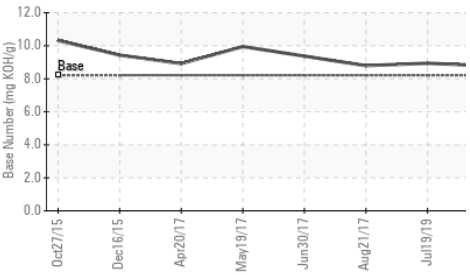
Fuel Dilution



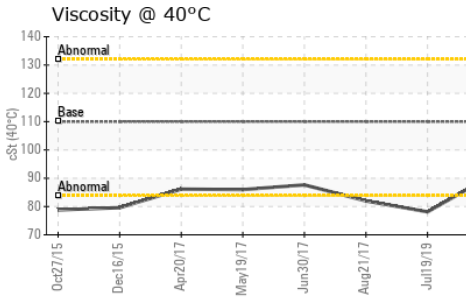
Viscosity @ 40°C



Base Number



Viscosity @ 40°C

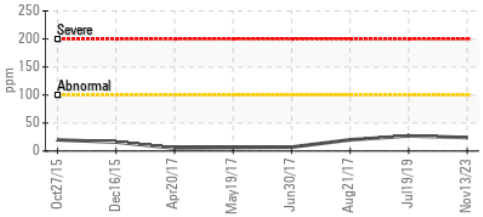


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt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

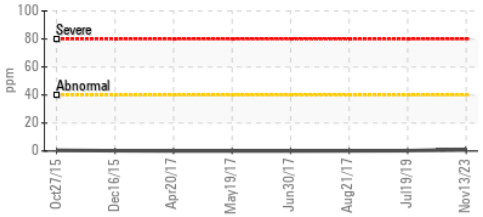
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	110	**90.5**	▲ 78.12	81.98
Visc @ 100°C	cSt	ASTM D445	15	▲ **12.3**	▲ 11.6	12.16
Viscosity Index (VI)	Scale	ASTM D2270	143	**130**	141	143

GRAPHS

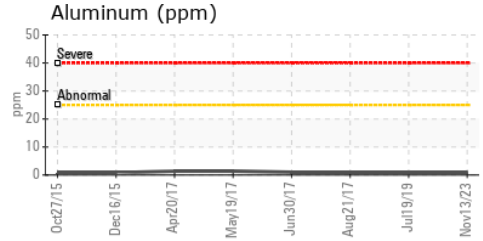
Iron (ppm)



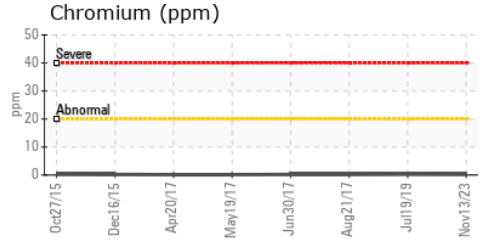
Lead (ppm)



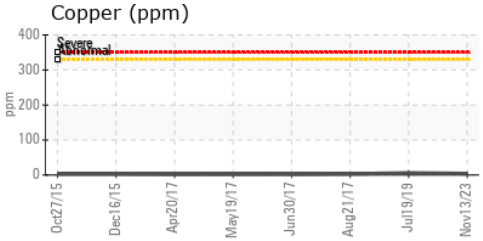
Aluminum (ppm)



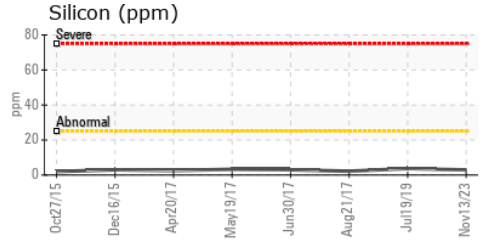
Chromium (ppm)



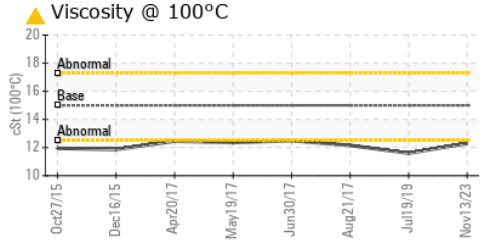
Copper (ppm)



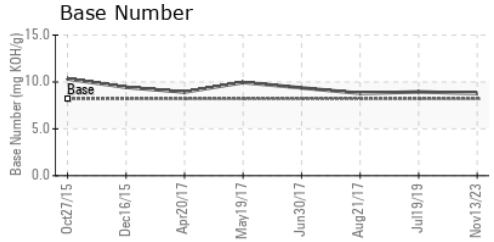
Silicon (ppm)



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : TO10002867 **Received** : 17 Nov 2023
Lab Number : 06011635 **Diagnosed** : 21 Nov 2023
Unique Number : 10750779 **Diagnostician** : Don Baldridge
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)

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Report Id: ANCTUL [WUSCAR] 06011635 (Generated: 11/22/2023 12:54:39) Rev: 1

Submitted By: SKIP SAENGERHAUSEN