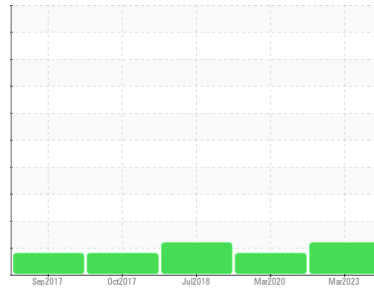


OIL ANALYSIS REPORT



Machine Id
CATERPILLAR 12H GRADER 6438 (S/N 8MR00572)
Component
Hydraulic System
Fluid
TULCO LUBSOIL SUPER HYDRAULIC HZ 46 (--- GAL)

Sample Rating Trend



DIAGNOSIS

Recommendation

We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. (Customer Sample Comment: 263 is machines hrs)

Wear

All component wear rates are normal.

Contamination

There is a high amount of silt (particulates < 14 microns in size) present in the oil.

Fluid Condition

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

SAMPLE INFORMATION

method	limit/base	current	history1	history2
Sample Number	Client Info	TO10001753	TO1006885	TO1006381
Sample Date	Client Info	20 Mar 2023	23 Mar 2020	14 Jul 2018
Machine Age	hrs	26300	13896	13328
Oil Age	hrs	263	1000	0
Oil Changed	Client Info	Not Changed	Changed	Not Changed
Sample Status		ABNORMAL	ABNORMAL	ABNORMAL

WEAR METALS

method	limit/base	current	history1	history2	
Iron	ppm	ASTM D5185m >20	6	29	30
Chromium	ppm	ASTM D5185m >10	0	<1	<1
Nickel	ppm	ASTM D5185m >10	0	<1	<1
Titanium	ppm	ASTM D5185m	0	<1	<1
Silver	ppm	ASTM D5185m	0	0	0
Aluminum	ppm	ASTM D5185m >10	1	6	6
Lead	ppm	ASTM D5185m >10	0	3	4
Copper	ppm	ASTM D5185m >75	6	33	36
Tin	ppm	ASTM D5185m >10	0	2	1
Antimony	ppm	ASTM D5185m	---	0	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	0	91	2
Barium	ppm	ASTM D5185m	0	0	0
Molybdenum	ppm	ASTM D5185m	0	<1	<1
Manganese	ppm	ASTM D5185m	<1	<1	<1
Magnesium	ppm	ASTM D5185m	172	63	25
Calcium	ppm	ASTM D5185m	196	163	160
Phosphorus	ppm	ASTM D5185m	648	482	471
Zinc	ppm	ASTM D5185m	862	587	535
Sulfur	ppm	ASTM D5185m	2969	2590	4342

CONTAMINANTS

method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185m >20	4	13	17
Sodium	ppm	ASTM D5185m	2	<1	1
Potassium	ppm	ASTM D5185m >20	0	2	3
Water	%	ASTM D6304 >0.1	NEG	NEG	0.009
ppm Water	ppm	ASTM D6304 >1000	---	---	90

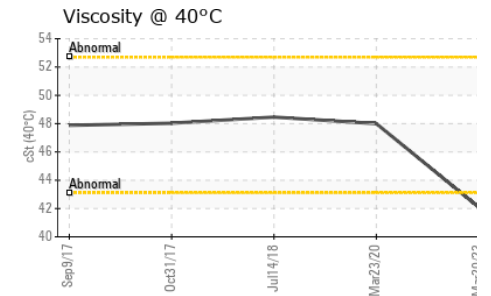
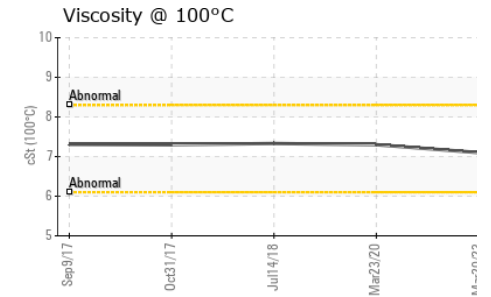
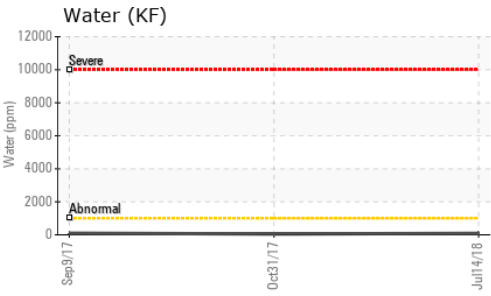
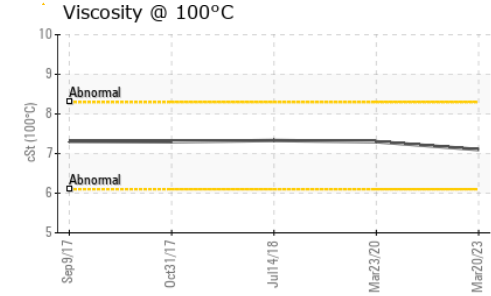
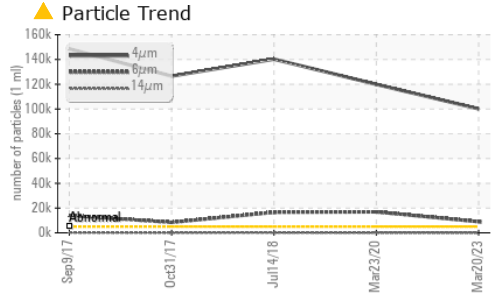
FLUID CLEANLINESS

method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647 >5000	▲ 100133	▲ 119897	▲ 140249
Particles >6µm	ASTM D7647 >1300	▲ 9019	▲ 16927	▲ 16573
Particles >14µm	ASTM D7647 >160	39	77	175
Particles >21µm	ASTM D7647 >40	7	10	25
Particles >38µm	ASTM D7647 >10	1	0	0
Particles >71µm	ASTM D7647 >3	0	0	0
Oil Cleanliness	ISO 4406 (c) >19/17/14	▲ 24/20/12	▲ 24/21/13	▲ 24/21/15

FLUID DEGRADATION

method	limit/base	current	history1	history2	
Acid Number (AN)	mg KOH/g	ASTM D8045	1.21	0.600	0.545

OIL ANALYSIS REPORT

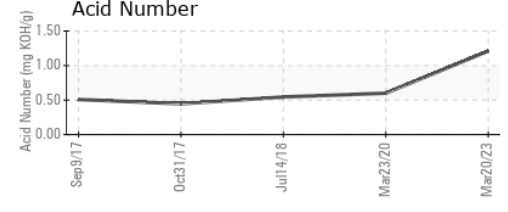
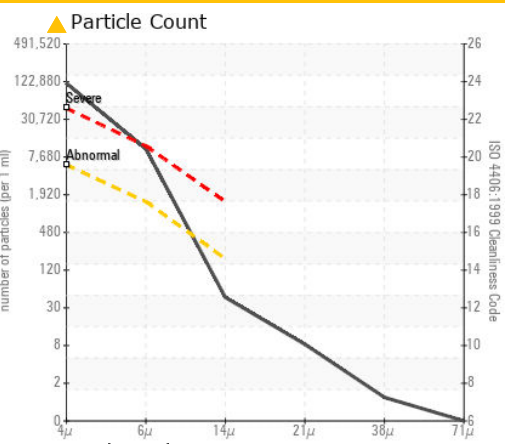
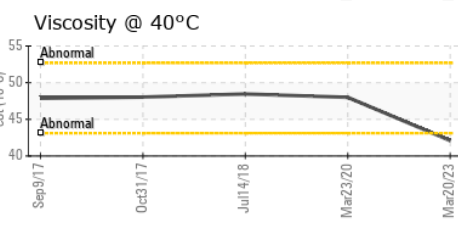
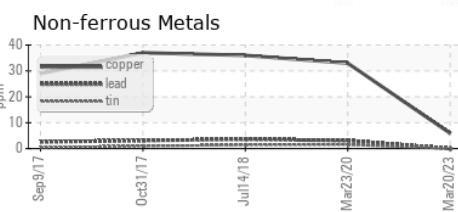
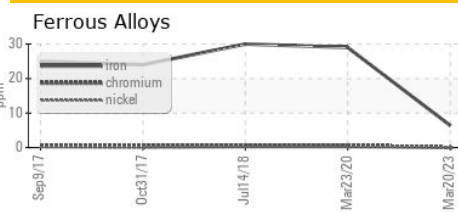


VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	42.1	48.0	48.46
Visc @ 100°C	cSt	ASTM D445	7.1	7.3	7.33
Viscosity Index (VI)	Scale	ASTM D2270	129	112	112

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color				no image	
Bottom				no image	

GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : TO10001753 **Received** : 28 Mar 2023
Lab Number : 05803972 **Tested** : 03 Apr 2023
Unique Number : 10401501 **Diagnosed** : 03 Apr 2023 - Doug Bogart
Test Package : MOB 2 (Additional Tests: KF, KV100, VI)

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 TULSA, OK
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 F:

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)