

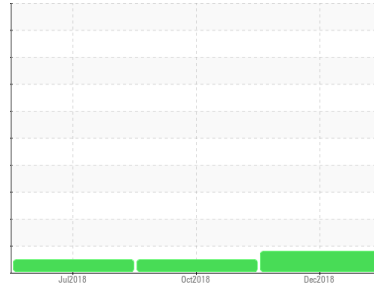


OIL ANALYSIS REPORT



Area
GUAY SON
Machine Id
CATERPILLAR ESTRELLA DE LOS MARES - IBACO
Component
Diesel Engine
Fluid
MAG-1 15W40 API C14 (160 LTR)

Sample Rating Trend



WEAR



DIAGNOSIS

▲ Recommendation

No corrective action is recommended at this time. 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). All other component wear rates are normal.

Contamination

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

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.

SAMPLE INFORMATION

	method	limit/base	current	history 1	history 2
Sample Number	Client Info		KL04642176	KL04587117	KL04509733
Sample Date	Client Info		26 Dec 2018	02 Oct 2018	05 Jul 2018
Machine Age	hrs	Client Info	4196	2882	2600
Oil Age	hrs	Client Info	1788	474	192
Oil Changed	Client Info		Not Chngd	Not Chngd	Not Chngd
Sample Status			ABNORMAL	NORMAL	NORMAL

CONTAMINATION

	method	limit/base	current	history 1	history 2
Fuel	WC Method	>5	<1.0	<1.0	<1.0
Glycol	WC Method		NEG	NEG	NEG

WEAR METALS

	method	limit/base	current	history 1	history 2
Iron	ppm	ASTM D5185m >100	27	13	2
Chromium	ppm	ASTM D5185m >20	<1	<1	<1
Nickel	ppm	ASTM D5185m >2	<1	<1	0
Titanium	ppm	ASTM D5185m >2	0	<1	<1
Silver	ppm	ASTM D5185m >2	<1	0	<1
Aluminum	ppm	ASTM D5185m >25	3	2	2
Lead	ppm	ASTM D5185m >40	2	1	0
Copper	ppm	ASTM D5185m >330	▲ 136	2	<1
Tin	ppm	ASTM D5185m >15	<1	0	0
Antimony	ppm	ASTM D5185m	0	0	0
Vanadium	ppm	ASTM D5185m	0	0	0
Cadmium	ppm	ASTM D5185m	0	0	0

ADDITIVES

	method	limit/base	current	history 1	history 2
Boron	ppm	ASTM D5185m	3	2	3
Barium	ppm	ASTM D5185m	0	0	0
Molybdenum	ppm	ASTM D5185m	74	64	65
Manganese	ppm	ASTM D5185m	<1	<1	<1
Magnesium	ppm	ASTM D5185m	811	933	901
Calcium	ppm	ASTM D5185m	1962	1946	1841
Phosphorus	ppm	ASTM D5185m	1070	1112	1066
Zinc	ppm	ASTM D5185m	1181	1268	1221
Sulfur	ppm	ASTM D5185m	4133	3188	3167

CONTAMINANTS

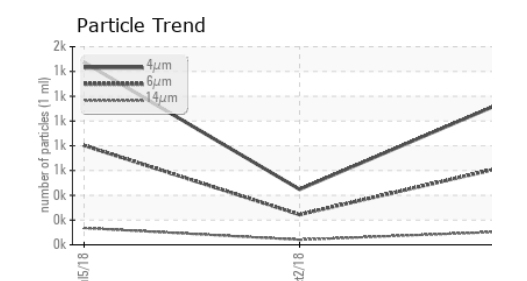
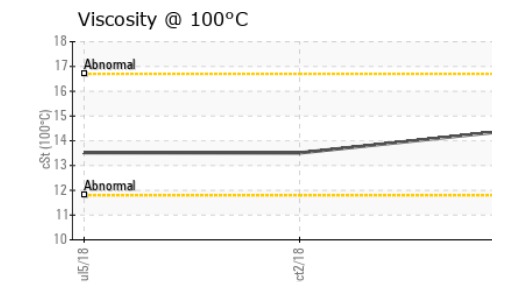
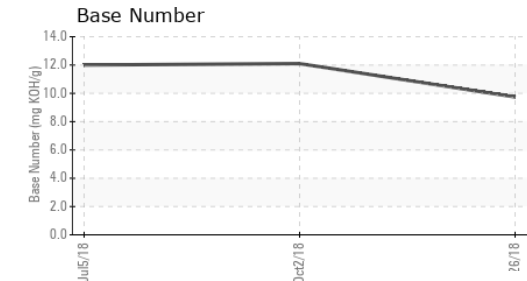
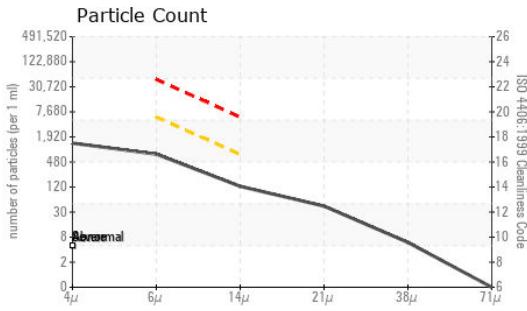
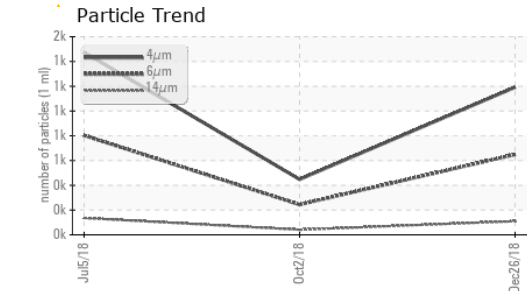
	method	limit/base	current	history 1	history 2
Silicon	ppm	ASTM D5185m >25	4	4	4
Sodium	ppm	ASTM D5185m	40	14	15
Potassium	ppm	ASTM D5185m >20	3	3	3

INFRA-RED

	method	limit/base	current	history 1	history 2
Soot %	%	*ASTM D7844 >3	0.8	0.3	0
Nitration	Abs/cm	*ASTM D7624 >20	10.5	7.5	5.
Sulfation	Abs./1mm	*ASTM D7415 >30	24.2	19.5	16.



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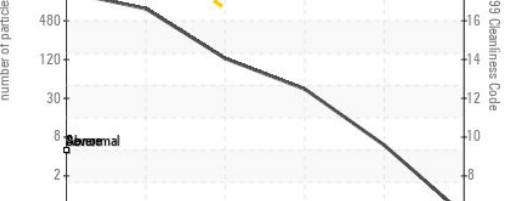
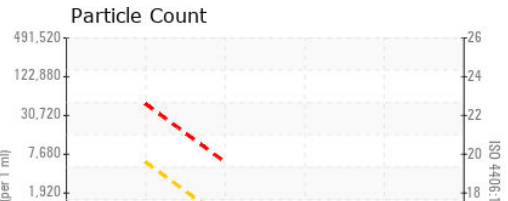
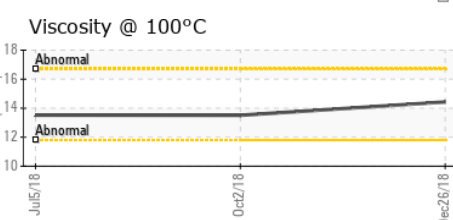
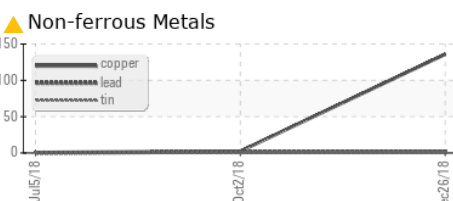
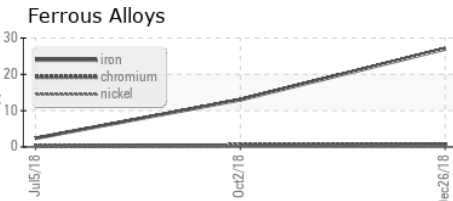
FLUID CLEANLINESS	method	limit/base	current	history 1	history 2
Particles >4µm	ASTM D7647		1192	448	1474
Particles >6µm	ASTM D7647	>5000	649	244	803
Particles >14µm	ASTM D7647	>640	110	41	136
Particles >21µm	ASTM D7647	>160	37	14	46
Particles >38µm	ASTM D7647	>40	5	2	7
Particles >71µm	ASTM D7647	>10	0	0	0
Oil Cleanliness	ISO 4406 (c)	>19/16	17/14	15/13	17/14

FLUID DEGRADATION	method	limit/base	current	history 1	history 2
Oxidation	Abs./1mm	*ASTM D7414 >25	20.6	15.6	13.
Base Number (BN)	mg KOH/g	ASTM D2896	9.74	12.1	12.0

VISUAL	method	limit/base	current	history 1	history 2
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	history 1	history 2
Visc @ 100°C	cSt	ASTM D445	14.43	13.51	13.52

GRAPHS



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL04642176 **Received** : 01 Feb 2019
Lab Number : **04642176** **Diagnosed** : 04 Feb 2019
Unique Number : 8483612 **Diagnostician** : Don Baldrige
Test Package : MOB 2 (Additional Tests: PrtCount)

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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