

OIL ANALYSIS REPORT

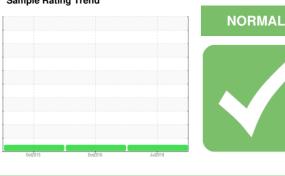
Sample Rating Trend



Area DE Samples - CAT LAB CATERPILLAR 775D HAUL TRUCK 6451 (S/N 6KR00212) Diesel Engine

TULCO LUBSOIL DT CI-4 15W40 (--- GAL)

SAMPLE INFORMATION method





DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the component.

Fluid Condition

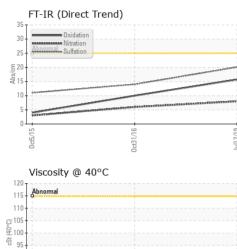
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

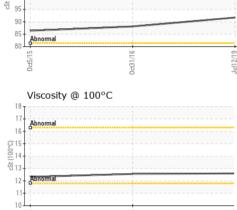
Sample Number Client Info T01006651 T01004840 T01004843 Sample Date Client Info 12 Jul 2019 31 Oct 2016 05 Oct 2015 Machine Age hrs Client Info 3507 34222 33217 Oil Age hrs Client Info 350 300 0 Oil Changed Client Info 350 300 0 0 Sample Status Imit/base Current NORMAL NORMAL NORMAL CONTAMINATION method Imit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 NCB WEAR METALS method Imit/base current history1 history2 Iron ppm ASTM05185m<>20 <1 <1 <1 <1 Nickel ppm ASTM05185m<>22 <1 <1 <1 <1 Silver ppm ASTM05185m<>22 1 2 2 2 Silver			method	iiiiii/base	Current	TIIStOLA	TIIStOryz
Machine Age Oil Age Oil Age Oil ChangedNisClient Info3503000Oil Changed Sample StatusClient InfoS503000Sample StatusIInterver NCRMALNORMALNORMALCONTAMINATIONmethod>5<1.0<1.0<1.0WaterWC Method>5<1.0<1.0<1.0WaterWC Method>5<1.0<1.0<1.0WaterWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0PomSTM D5165>100202518<1.0ChromiumppmASTM D5165>2<10<1.1NickelppmASTM D5165>2<10<1.1SilverppmASTM D5165>2<10<1.1AuminumppmASTM D5165>2<10<1.1AuminumppmASTM D5165>2<100AutimonyppmASTM D5165>2<100AutimonyppmASTM D5165>1000Astm D51655>10<1<111Astm D51655<100000<	Sample Number		Client Info		TO1006651	TO1005460	TO1004843
Machine Age Oil Age Oil Age Oil ChangedNisClient Info3503000Oil Changed Sample StatusClient InfoS503000Sample StatusIInterver NCRMALNORMALNORMALCONTAMINATIONmethod>5<1.0<1.0<1.0WaterWC Method>5<1.0<1.0<1.0WaterWC Method>5<1.0<1.0<1.0WaterWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0WetarWC Method>5<1.0<1.0<1.0PomSTM D5165>100202518<1.0ChromiumppmASTM D5165>2<10<1.1NickelppmASTM D5165>2<10<1.1SilverppmASTM D5165>2<10<1.1AuminumppmASTM D5165>2<10<1.1AuminumppmASTM D5165>2<100AutimonyppmASTM D5165>2<100AutimonyppmASTM D5165>1000Astm D51655>10<1<111Astm D51655<100000<	Sample Date		Client Info		12 Jul 2019	31 Oct 2016	05 Oct 2015
Oil Age hrs Client Info 350 300 0 Oil Changed Client Info Changed Changed Changed Changed Changed NORMAL NORMAL NORMAL CONTAMINATION method init/base current history1 history2 Fuel WC Method >0.2 NEG NEG NEG Glycol WC Method >0.2 NEG NEG NEG WeAR METALS method Imit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 <1 0 <1 Nickel ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m >2 <1 0 0 Aluminum ppm ASTM D5185m	Machine Age	hrs	Client Info		36307		
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Chromium ppm ASTM D5185m >20 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 <1	Iron	ppm	ASTM D5185m	>100	20	25	18
Titanium ppm ASTM D5185m >2 <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Titanium ppm ASTM D5185m >2 <1	Nickel	ppm	ASTM D5185m	>2	<1	<1	0
Silver ppm ASTM D5185m >2 <1			ASTM D5185m	>2	<1	0	<1
Aluminum ppm ASTM D5185m >25 1 2 2 Lead ppm ASTM D5185m >40 <1 7 2 Copper ppm ASTM D5185m >330 1 2 2 Tin ppm ASTM D5185m >15 0 <1 0 Antimony ppm ASTM D5185m 0 0 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Magnese ppm ASTM D5185m 64 62 57 Magnese ppm ASTM D5185m 1287 1061 1119 Phosphorus ppm ASTM D5185m 1228 1094 1276 Sulfur<					<1		
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Copper ppm ASTM D5185m >330 1 2 2 Tin ppm ASTM D5185m >15 0 <1 0 Antimony ppm ASTM D5185m 0 0 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 16 3 0 0 Maganese ppm ASTM D5185m 64 62 57 Manganese ppm ASTM D5185m 942 962 932 Calcium ppm ASTM D5185m 1020 957 1052 Zinc ppm ASTM D5185m 12287 1061 1119 Sulfur ppm ASTM D5185m 22 2 2 Sulfur ppm ASTM D5185m							
Tin ppm ASTM D5185m >15 0 <1				>330			
Antimony ppm ASTM D5185m 0 0 <1							
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Calcium ppm ASTM D5185m 1287 1061 1119 Phosphorus ppm ASTM D5185m 1020 957 1052 Zinc ppm ASTM D5185m 1228 1094 1276 Sulfur ppm ASTM D5185m 2874 3419 2938 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m >20 19 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 8 6. 3. Sulfation Abs/.1mm *ASTM D7624 >20 8 6. 3. Sulfation Abs/.1mm *ASTM D7624 >20 8 6. 3.	Manganese	ppm	ASTM D5185m				
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Zinc ppm ASTM D5185m 1228 1094 1276 Sulfur ppm ASTM D5185m 2874 3419 2938 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m >20 19 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.5 0.2 0 Nitration Abs/cm *ASTM D7624 >20 8 6. 3. Sulfation Abs/tmm *ASTM D7415 >30 20.1 14. 11. FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7	Calcium	ppm	ASTM D5185m		1287	1061	1119
SulfurppmASTM D5185m287434192938CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25433SodiumppmASTM D5185m2222PotassiumppmASTM D5185m>2019<10INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>30.50.20NitrationAbs/cm*ASTM D7624>2086.3.SulfationAbs/imm*ASTM D7415>3020.114.11.FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/1mm*ASTM D7414>2515.710.4.Base Number (BN)mg KOH/gASTM D28969.619.6013.90	Phosphorus	ppm	ASTM D5185m		1020	957	1052
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m >20 19 2 2 2 Potassium ppm ASTM D5185m >20 19 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.5 0.2 0 Nitration Abs/cm *ASTM D7624 >20 8 6. 3. Sulfation Abs/.1mm *ASTM D7415 >30 20.1 14. 11. FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7 10. 4. Base Number (BN) mg KOH/g	Zinc	ppm	ASTM D5185m		1228	1094	1276
Silicon ppm ASTM D5185m >25 4 3 3 Sodium ppm ASTM D5185m 2 2 2 2 Potassium ppm ASTM D5185m >20 19 <1	Sulfur	ppm	ASTM D5185m		2874	3419	2938
Sodium ppm ASTM D5185m 2 2 2 Potassium ppm ASTM D5185m >20 19 <1 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.5 0.2 0 Nitration Abs/cm *ASTM D7624 >20 8 6. 3. Sulfation Abs/.1mm *ASTM D7415 >30 20.1 14. 11. FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7 10. 4. Base Number (BN) mg K0H/g ASTM D2896 9.61 9.60 13.90	CONTAMINANTS		method	limit/base	current	history1	history2
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INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.5 0.2 0 Nitration Abs/cm *ASTM D7624 >20 8 6. 3. Sulfation Abs/.1mm *ASTM D7415 >30 20.1 14. 11. FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7 10. 4. Base Number (BN) mg KOH/g ASTM D2896 9.61 9.60 13.90	Sodium	ppm	ASTM D5185m		2	2	2
Soot % % *ASTM D7844 >3 0.5 0.2 0 Nitration Abs/cm *ASTM D7624 >20 8 6. 3. Sulfation Abs/.1mm *ASTM D7415 >30 20.1 14. 11. FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7 10. 4. Base Number (BN) mg KOH/g ASTM D2896 9.61 9.60 13.90	Potassium	ppm	ASTM D5185m	>20	19	<1	0
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Base Number (BN) mg KOH/g ASTM D2896 9.61 9.60 13.90							
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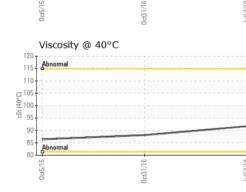
Contact/Location: DAVID MORRIS - ANCTUL



OIL ANALYSIS REPORT







VISUAL		method	limit/base	current	history1	history
/hite Metal	scalar	*Visual	NONE	NONE	NONE	NONE
ellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
recipitate	scalar	*Visual	NONE	NONE	NONE	NONE
ilt	scalar	*Visual	NONE	NONE	NONE	NONE
ebris	scalar	*Visual	NONE	NONE	NONE	NONE
and/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
ppearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
mulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
ree Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history
/isc @ 40°C	cSt	ASTM D445		91.7	88.12	86.41
/isc @ 100°C	cSt	ASTM D445		12.6	12.56	12.32
iscosity Index (VI)	Scale	ASTM D2270		133	139	137
GRAPHS						
Iron (ppm)			100	Lead (ppm)		
Severe			80	Smillion		
Abnormal			E 60	Abarant		
- O			10			
			20			
0ct5/15 -	0ct31/16 -		- e1/211uL	0ct5/15 -	0ct31/16 -	
00	0 ct3		Jult	0	0 ct3	
Aluminum (ppm)			50	Chromium (p	pm)	
Severe			40	Smillion		
Abnormal			= ³⁰			
			E ³⁰	Abnormal		
			10			
0ct5/15	-1/16			0ct5/15	.716	
000	0ct31/16		Jul12/19	Octf	0ct31/16	
Copper (ppm)				Silicon (ppm)		
Severe			80			
			60 E	i.		
•			년, 40	Abnormal		
			20			
2/15	.116 -		61/2	5/15	-16	
0ct5/15	0ct31/16		Jul12/19	0ct5/1	0ct31/16	
Viscosity @ 100°C				Base Number		
Abnormal	1		0.01/(d) Base Number (mg KOH/(d)			
			B10.0			
Almontal			E 5.0			
	nnnaaaa		ase Nu			
0ct5/15	-16		. 0.0		9	
t2	0ct31/16		Jul12/19	0ct5/15	0ct31/16	

Laboratory Sample No. Lab Number : 04762437 Tested : 26 Jul 2019 TULSA, OK Unique Number : 8680216 : 26 Jul 2019 - Jonathan Hester US 74137 Diagnosed Test Package : MOB 2 (Additional Tests: KV40, VI) Contact: DAVID MORRIS Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. dmorris@anchorstoneco.com * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F:

Contact/Location: DAVID MORRIS - ANCTUL