

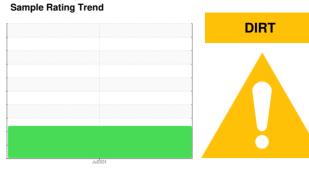
OIL ANALYSIS REPORT

MINING

ME-328 - DIP STICK KOMATSU WA470-8 A49715

Diesel Engine

SHELL ROTELLA T 15W40 (--- GAL)



DIAGNOSIS

Recommendation

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

All component wear rates are normal.

Contamination

Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress.

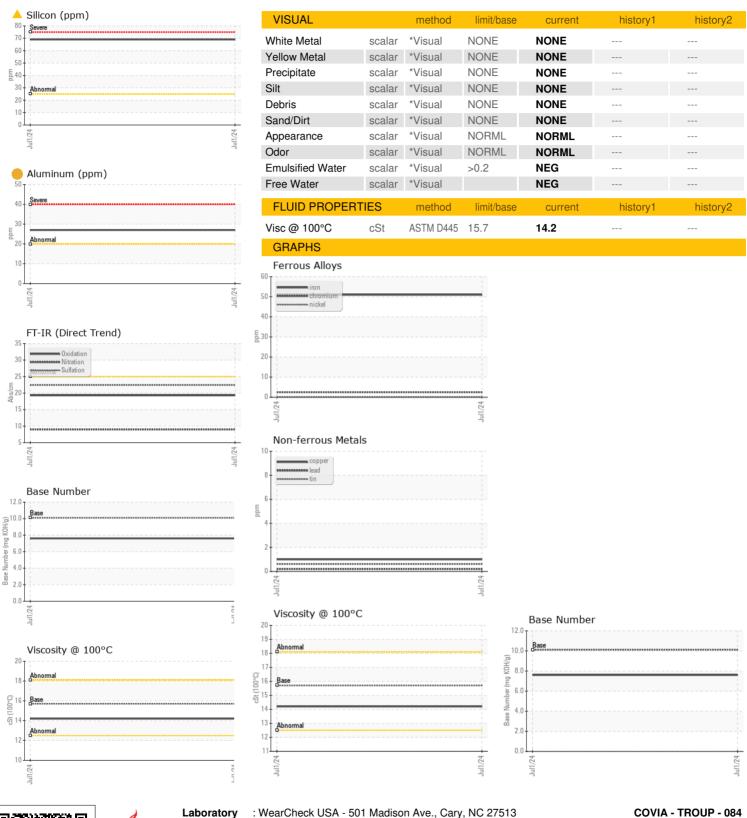
Fluid Condition

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

Client Info Record Client Info Record Record					Jui2024		
Client Info	SAMPLE INFORMA	ATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 8237	Sample Number		Client Info		WC0938500		
Oil Age hrs Client Info 336 Oil Changed Client Info Changed Sample Status ABNORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 Water WC Method NEG Weder WC Method NEG Wear METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 51 Mickel ppm ASTM D5185m >20 2 Chromium ppm ASTM D5185m >4 0 Mickel ppm ASTM D5185m >20 27 Lead ppm ASTM D5185m >40 <1	Sample Date		Client Info		01 Jul 2024		
Client Info Changed Client Info ABNORMAL CONTAMINATION Method Imit/base current history1 history2	Machine Age	hrs	Client Info		8237		
CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		336		
CONTAMINATION	Oil Changed		Client Info		Changed		
Fuel	Sample Status				ABNORMAL		
Water Glycol WC Method WC Method >0.2 NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 51 Chromium ppm ASTM D5185m >20 2 Nickel ppm ASTM D5185m >4 0 Silver ppm ASTM D5185m >4 0 Silver ppm ASTM D5185m >4 0 Aluminum ppm ASTM D5185m >40 <1	CONTAMINATION		method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>5	<1.0		
WEAR METALS	Water		WC Method	>0.2	NEG		
Description Description	Glycol		WC Method		NEG		
Chromium	WEAR METALS		method	limit/base	current	history1	history2
Strickel	ron	ppm	ASTM D5185m	>100	51		
Nickel			ASTM D5185m	>20	2		
Silver	Nickel	ppm	ASTM D5185m	>4	0		
Aluminum ppm ASTM D5185m >20	Titanium	ppm	ASTM D5185m		2		
Lead	Silver	ppm	ASTM D5185m	>3	0		
Copper	Aluminum	ppm	ASTM D5185m	>20	<u>27</u>		
Tin ppm ASTM D5185m >1.5 <1 · · · · · · · · · ·-	Lead	ppm	ASTM D5185m	>40	<1		
Vanadium ppm ASTM D5185m <1 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 316 102 Barium ppm ASTM D5185m 0.0 0 Molybdenum ppm ASTM D5185m 1.2 0 Manganese ppm ASTM D5185m 24 17 Magnesium ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 2292 2460 Zinc ppm ASTM D5185m 1160 1344 CONTAMINANTS method limit/base current hi	Copper	ppm	ASTM D5185m	>330	1		
Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 316 102 Barium ppm ASTM D5185m 0.0 0 Molybdenum ppm ASTM D5185m 1.2 0 Manganese ppm ASTM D5185m 24 17 Magnesium ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 292 2460 Phosphorus ppm ASTM D5185m 2292 2460 Zinc ppm ASTM D5185m 1160 1344 Zinc ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current<	Tin	ppm	ASTM D5185m	>15	<1		
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 316 102 Barium ppm ASTM D5185m 0.0 0 Molybdenum ppm ASTM D5185m 1.2 0 Manganese ppm ASTM D5185m 24 17 Magnesium ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 1064 1150 Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Solium ppm ASTM D5185m	Vanadium	ppm	ASTM D5185m		<1		
Boron ppm ASTM D5185m 316 102 Barium ppm ASTM D5185m 0.0 0 Molybdenum ppm ASTM D5185m 1.2 0 Manganese ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 1064 1150 Phosphorus ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 Sulfur ppm ASTM D5185m 25	Cadmium	ppm	ASTM D5185m		0		
Barium ppm ASTM D5185m 0.0 0 Molybdenum ppm ASTM D5185m 1.2 0 Magnaese ppm ASTM D5185m 24 17	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 1.2 0 Manganese ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 1064 1150 Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Soliicon ppm ASTM D5185m >25 699 Sodium ppm ASTM D5185m >20 6 Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/bas	Boron	ppm	ASTM D5185m	316	102		
Manganese ppm ASTM D5185m <1 Magnesium ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 1064 1150 Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2	Barium	ppm	ASTM D5185m	0.0	0		
Magnesium ppm ASTM D5185m 24 17 Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 1064 1150 Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m 20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7414 >25 <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>1.2</td> <td>0</td> <td></td> <td></td>	Molybdenum	ppm	ASTM D5185m	1.2	0		
Calcium ppm ASTM D5185m 2292 2460 Phosphorus ppm ASTM D5185m 1064 1150 Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base	Manganese	ppm	ASTM D5185m		<1		
Phosphorus ppm ASTM D5185m 1 064 1150 Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m 20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Sulfation Abs/.1mm *ASTM D7624 >20 9.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 <	Magnesium	ppm	ASTM D5185m	24	17		
Zinc ppm ASTM D5185m 1160 1344 Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m 20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Sulfation Abs/.1mm *ASTM D7624 >20 9.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Calcium	ppm	ASTM D5185m	2292	2460		
Sulfur ppm ASTM D5185m 4996 4542 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Nitration Abs/cm *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Phosphorus	ppm	ASTM D5185m	1064	1150		
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 ▲ 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Nitration Abs/cm *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Zinc	ppm	ASTM D5185m	1160	1344		
Silicon ppm ASTM D5185m >25 ♠ 69 Sodium ppm ASTM D5185m 2 Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Nitration Abs/cm *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Sulfur	ppm	ASTM D5185m	4996	4542		
Sodium	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 6 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 Nitration Abs/cm *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Silicon	ppm	ASTM D5185m	>25	69		
INFRA-RED	Sodium	ppm	ASTM D5185m		2		
Soot % *ASTM D7844 >3 0.2 Nitration Abs/cm *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Potassium	ppm	ASTM D5185m	>20	6		
Nitration Abs/cm *ASTM D7624 >20 9.0 Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 22.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Soot %	%	*ASTM D7844	>3	0.2		
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 19.3	Nitration	Abs/cm	*ASTM D7624	>20	9.0		
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30	22.4		
	FLUID DEGRADAT	TION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	19.3		
		mg KOH/q	ASTM D2896	10.1	7.6		



OIL ANALYSIS REPORT





Certificate 12367

Laboratory Sample No.

: WC0938500 Lab Number : 06237266 Unique Number : 11126100

To discuss this sample report, contact Customer Service at 1-800-237-1369.

Received : 15 Jul 2024 **Tested** Diagnosed

: 17 Jul 2024

: 17 Jul 2024 - Don Baldridge

Test Package : CONST (Additional Tests: TBN)

US 75789 Contact: Forrest Howell forrest.howell@coviacorp.com T: (903)574-0693

23769 STATE HWY 110 NORTH

* - 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)

Report Id: COVTRO [WUSCAR] 06237266 (Generated: 07/17/2024 16:57:48) Rev: 1

Contact/Location: Forrest Howell - COVTRO

TROUP, TX