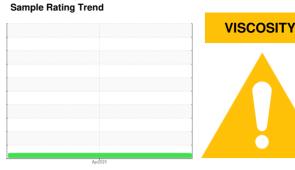


# **OIL ANALYSIS REPORT**

# KANSAS/44/EG - EXCAVATOR 20.146L [KANSAS^44^EG - EXCAVATOR]

**Diesel Engine** 

CAT DIESEL ENGINE OIL 15W40 (--- GAL)



### **DIAGNOSIS**

#### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

#### Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

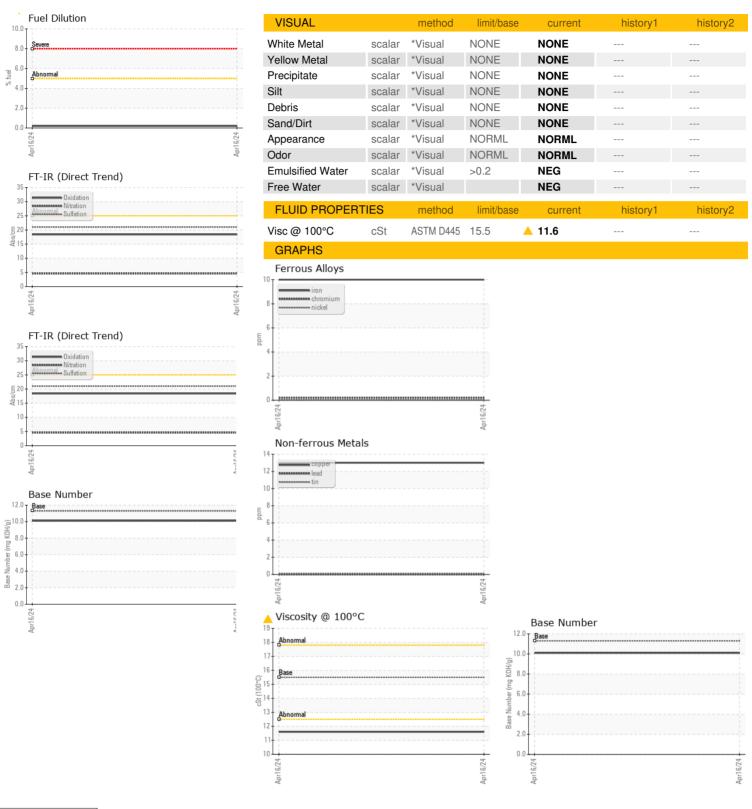
### Fluid Condition

The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

SAMPLE INFORMATION			·		Apr2024		
Sample Date         Client Info         16 Apr 2024             Machine Age         hrs         Client Info         8             Oil Age         hrs         Client Info         8             Oil Changed         Client Info         Not Changd             Sample Status         Image: Control of the Info         ABNORMAL             CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         NEG              Iron         ppm         ASTM 5185m         >100         10             Iron         ppm         ASTM 5185m         >10         10             WEAR METALS         method         limil/base         current         history1         history2           Wear METALS         method         limil/base         current         history1         history2           Wear METALS         method         limil/base         current         history1         history2           Wear METALS         ppm	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         8             Oil Age         hrs         Client Info         8             Oil Changed         Client Info         Not Changd             Sample Status         Learner         Learner         Machine             CONTAMINATION         method         limil/base         current         history1         history2           Water         WC Method         NEG             WEAR METALS         method         limil/base         current         history1         history2           Iron         ppm         ASTM DS185m         >100         10             Nickel         ppm         ASTM DS185m         >20         <1             Nickel         ppm         ASTM DS185m         >20         <1             Nickel         ppm         ASTM DS185m         >4         0             Aluminum         ppm         ASTM DS185m         >0              Aluminum         pp	Sample Number		Client Info		WC0821448		
Oil Age         hrs         Client Info         Not Changd	Sample Date		Client Info		16 Apr 2024		
Contamination	Machine Age	hrs	Client Info		8		
CONTAMINATION	Oil Age	hrs	Client Info		8		
CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG             Glycol         WC Method         NEG             WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         10             Chromium         ppm         ASTM D5185m         >20         <1             Nickel         ppm         ASTM D5185m         >4         0             Silver         ppm         ASTM D5185m         >4         0             Aluminum         ppm         ASTM D5185m         >20         3             Aluminum         ppm         ASTM D5185m         >40         0             Lead         ppm         ASTM D5185m         >15         <1             Copper         ppm         ASTM D5185m         >16         <1 </th <th>Oil Changed</th> <th></th> <th>Client Info</th> <th></th> <th>Not Changd</th> <th></th> <th></th>	Oil Changed		Client Info		Not Changd		
Water         WC Method         >0.2         NEG             Glycol         WC Method         Ilmit/base         current         history1         history2           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         10             Chromium         ppm         ASTM D5185m         >20         <1	Sample Status				ABNORMAL		
Glycol         WC Method         NEG             WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         10             Nickel         ppm         ASTM D5185m         >20         <1	CONTAMINATION	N	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >10             Chromium         ppm         ASTM D5185m         >20         <1             Nickel         ppm         ASTM D5185m         >4         0             Titanium         ppm         ASTM D5185m         >3         0             Aluminum         ppm         ASTM D5185m         >3         0             Aluminum         ppm         ASTM D5185m         >40         0             Lead         ppm         ASTM D5185m         >40         0             Copper         ppm         ASTM D5185m         >15         <1             Vanadium         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         9	Water		WC Method	>0.2	NEG		
Iron	Glycol		WC Method		NEG		
Chromium	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	10		
Titanium	Chromium	ppm	ASTM D5185m	>20	<1		
Silver         ppm         ASTM D5185m         >3         0             Aluminum         ppm         ASTM D5185m         >20         3             Lead         ppm         ASTM D5185m         >40         0             Copper         ppm         ASTM D5185m         >330         13             Tin         ppm         ASTM D5185m         >15         <1             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         73             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         9              Boron         ppm         ASTM D5185m         3 <tr< td=""><th>Nickel</th><td>ppm</td><td>ASTM D5185m</td><td>&gt;4</td><th>0</th><td></td><td></td></tr<>	Nickel	ppm	ASTM D5185m	>4	0		
Aluminum         ppm         ASTM D5185m         >20         3             Lead         ppm         ASTM D5185m         >40         0             Copper         ppm         ASTM D5185m         >330         13             Tin         ppm         ASTM D5185m         >15         <1             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         73             Barium         ppm         ASTM D5185m         9             Molybdenum         ppm         ASTM D5185m         3             Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         925             Phosphorus         ppm         ASTM D	Titanium	ppm	ASTM D5185m		0		
Lead	Silver	ppm	ASTM D5185m	>3	0		
Copper         ppm         ASTM D5185m         >330         13             Tin         ppm         ASTM D5185m         >15         <1             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         73             Barium         ppm         ASTM D5185m         9             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         30             Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         925             Phosphorus         ppm         ASTM D5185m         3438             Sulfur         ppm         ASTM D5185m         34338	Aluminum	ppm	ASTM D5185m	>20	3		
Tin         ppm         ASTM D5185m         >15         <1	Lead	ppm	ASTM D5185m	>40	0		
Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         73             Barium         ppm         ASTM D5185m         9             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         503             Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         925             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         1460         1054             Sulfur         ppm         ASTM D5185m         >25         13             CONTAMINANTS         method         limit/base	Copper	ppm	ASTM D5185m	>330	13		
Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         73             Barium         ppm         ASTM D5185m         9             Molybdenum         ppm         ASTM D5185m         35             Magnese         ppm         ASTM D5185m         3             Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         925             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         925             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13	Tin	ppm	ASTM D5185m	>15	<1		
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         73             Barium         ppm         ASTM D5185m         9             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         503             Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         925             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         925             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         >20 <th>Vanadium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th></th> <th></th>	Vanadium	ppm	ASTM D5185m		0		
Boron	Cadmium	ppm	ASTM D5185m		0		
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         503             Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         1540             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         3438             Sulfur         ppm         ASTM D5185m         25         13             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         25         13             Sodium         ppm         ASTM D5185m         20         1             Fuel         %         ASTM D5185m         20         1             Fuel         %         ASTM	Boron	ppm	ASTM D5185m		73		
Manganese         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         503             Phosphorus         ppm         ASTM D5185m         1540             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         1460         1054             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         >20         1             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D324         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2 <td< th=""><th>Barium</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>9</th><th></th><th></th></td<>	Barium	ppm	ASTM D5185m		9		
Magnesium         ppm         ASTM D5185m         503             Calcium         ppm         ASTM D5185m         1540             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         1460         1054             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         >25         13             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         4.6	Molybdenum	ppm	ASTM D5185m		35		
Calcium         ppm         ASTM D5185m         1540             Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         1460         1054             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         >20         1             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D5185m         >20         1             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/.1mm         *ASTM D7415         >30         21.0	Manganese	ppm	ASTM D5185m		3		
Phosphorus         ppm         ASTM D5185m         925             Zinc         ppm         ASTM D5185m         1460         1054             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         >20         1             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D5185m         >20         1             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/:1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current	Magnesium	ppm	ASTM D5185m		503		
Zinc         ppm         ASTM D5185m         1460         1054             Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         20         1             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/:m         *ASTM D7624         >20         4.6             Sulfation         Abs/:m         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current<	Calcium	ppm	ASTM D5185m		1540		
Sulfur         ppm         ASTM D5185m         3438             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         4             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414	Phosphorus	ppm	ASTM D5185m		925		
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         13              Sodium         ppm         ASTM D5185m         >20         1              Potassium         ppm         ASTM D5185m         >20         1              Fuel         %         ASTM D3524         >5         0.2              INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/.mm         *ASTM D7624         >20         4.6             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	Zinc	ppm	ASTM D5185m	1460	1054		
Silicon         ppm         ASTM D5185m         >25         13             Sodium         ppm         ASTM D5185m         4              Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	Sulfur	ppm	ASTM D5185m		3438		
Sodium         ppm         ASTM D5185m         4             Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         1             Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	Silicon	ppm	ASTM D5185m	>25	13		
Fuel         %         ASTM D3524         >5         0.2             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4							
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	Sodium	ppm	ASTM D5185m		4		
Soot %         %         *ASTM D7844         >3         0.1             Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4				>20			
Nitration         Abs/cm         *ASTM D7624         >20         4.6             Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	Potassium	ppm	ASTM D5185m		1		
Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.4	Potassium Fuel	ppm	ASTM D5185m ASTM D3524	>5	1 0.2		
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     18.4	Potassium Fuel INFRA-RED	ppm %	ASTM D5185m ASTM D3524 method	>5 limit/base	1 0.2 current	  history1	history2
Oxidation	Potassium Fuel INFRA-RED Soot %	ppm %	ASTM D5185m ASTM D3524 method *ASTM D7844	>5 limit/base >3	1 0.2 current 0.1	history1	history2
	Potassium Fuel INFRA-RED Soot % Nitration	ppm % % Abs/cm	ASTM D5185m ASTM D3524 method *ASTM D7844 *ASTM D7624	>5 limit/base >3 >20	1 0.2 current 0.1 4.6	 history1 	history2
	Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm % % Abs/cm Abs/.1mm	ASTM D5185m ASTM D3524 method *ASTM D7844 *ASTM D7624 *ASTM D7415	>5 limit/base >3 >20 >30	1 0.2 current 0.1 4.6 21.0	 history1 	 history2 
	Potassium Fuel  INFRA-RED  Soot % Nitration Sulfation FLUID DEGRADA	% % Abs/cm Abs/.1mm	ASTM D5185m ASTM D3524 method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	>5 limit/base >3 >20 >30 limit/base	1 0.2 current 0.1 4.6 21.0 current	history1	history2 history2



## **OIL ANALYSIS REPORT**







Certificate 12367

Laboratory Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0821448 Lab Number : 06155633

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

Received **Tested** Unique Number : 10991056

: 22 Apr 2024 : 25 Apr 2024 Diagnosed

: 25 Apr 2024 - Angela Borella Test Package : CONST ( Additional Tests: FuelDilution, PercentFuel, TBN )

WICHITA, KS US 67213 Contact: RANDY ROBERTS randy.roberts@sherwood.net T: (316)943-6491 F: x:

3219 WEST MAY ST

SHERWOOD CONSTRUCTION CO INC

 $^st$  - 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)