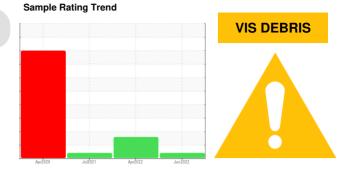


OIL ANALYSIS REPORT

Area
RIG 2 **R2-TD-G-NKL**

Gearbox

GEAR OIL SAE 80 (--- GAL)



DIAGNOSIS

Recommendation

We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. We were unable to perform a particle count due to a high concentration of particles present in this sample.

All component wear rates are normal.

Contamination

Moderate concentration of visible dirt/debris present in the oil.

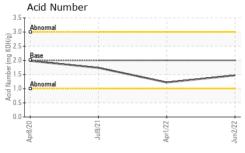
Fluid Condition

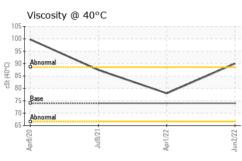
The AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service.

SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		KL0008008	KL0004438	KL0005743
Sample Date		Client Info		02 Jun 2022	01 Apr 2022	09 Jul 2021
Machine Age	days	Client Info		44721	44649	44384
Oil Age	days	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				ABNORMAL	ABNORMAL	ABNORMAL
CONTAMINATION	V	method	limit/base	current	history1	history2
Water		WC Method	>0.2	NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>200	119	149	36
Chromium	ppm	ASTM D5185m	>10	<1	1	<1
Nickel	ppm	ASTM D5185m		0	3	<1
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m		<1	12	<1
Aluminum	ppm	ASTM D5185m	>25	3	5	<1
Lead	ppm	ASTM D5185m	>50	<1	<1	0
Copper	ppm	ASTM D5185m	>200	10	9	4
Tin	ppm	ASTM D5185m	>10	0	<1	<1
Antimony	ppm	ASTM D5185m				0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		<1	2	0
Cadmium ADDITIVES	ppm	ASTM D5185m method	limit/base	<1 current	2 history1	0 history2
	ppm		limit/base			
ADDITIVES		method		current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	400	current 93	history1 40	history2 145
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185m ASTM D5185m	400 200	current 93 9	history1 40 24	history2 145 0
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	400 200	current 93 9 5	history1 40 24 <1	history2 145 0 <1
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	400 200 12	93 9 5 1	history1 40 24 <1 2	history2 145 0 <1 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	400 200 12	93 9 5 1 7	history1 40 24 <1 2 9	history2 145 0 <1 <1 6
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	400 200 12 12 150	current 93 9 5 1 7 26	history1 40 24 <1 2 9 54	history2 145 0 <1 <1 6 30
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650	current 93 9 5 1 7 26 1147	history1 40 24 <1 2 9 54 999	history2 145 0 <1 <1 6 30 1140
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125	current 93 9 5 1 7 26 1147 107	history1 40 24 <1 2 9 54 999 147	history2 145 0 <1 <1 6 30 1140 100
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125 22500	current 93 9 5 1 7 26 1147 107 18201	history1 40 24 <1 2 9 54 999 147 13744	history2 145 0 <1 <1 6 30 1140 100 15626
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125 22500 limit/base	current 93 9 5 1 7 26 1147 107 18201 current	history1 40 24 <1 2 9 54 999 147 13744 history1	history2 145 0 <1 <1 6 30 1140 100 15626 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125 22500 limit/base	current 93 9 5 1 7 26 1147 107 18201 current 8	history1 40 24 <1 2 9 54 999 147 13744 history1 17	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125 22500 Imit/base >50	current 93 9 5 1 7 26 1147 107 18201 current 8 28	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125 22500 limit/base >50 >20	current 93 9 5 1 7 26 1147 107 18201 current 8 28 4	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103 7	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	400 200 12 12 150 1650 125 22500 limit/base >50	current 93 9 5 1 7 26 1147 107 18201 current 8 28 4	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103 7 history1	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21 <1 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m method ASTM D5185m	400 200 12 12 150 1650 125 22500 limit/base >50	current 93 9 5 1 7 26 1147 107 18201 current 8 28 4 current	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103 7 history1 195893	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21 <1 history2 98763
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m method ASTM D5185m	400 200 12 12 150 1650 125 22500 limit/base >50 >20 limit/base	current 93 9 5 1 7 26 1147 107 18201 current 8 28 4 current	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103 7 history1 195893 ▲ 30405	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21 <1 history2 98763 ▲ 10769
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m method ASTM D5185m ASTM D7647 ASTM D7647	400 200 12 12 150 1650 125 22500 limit/base >50 >20 limit/base	current 93 9 5 1 7 26 1147 107 18201 current 8 28 4 current	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103 7 history1 195893 ▲ 30405 ● 669	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21 <1 history2 98763 ▲ 10769 228
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m method ASTM D5185m ASTM D7647 ASTM D7647 ASTM D7647	400 200 12 12 150 1650 125 22500 limit/base >50 >20 limit/base >5000 >640 >160 >40	current 93 9 5 1 7 26 1147 107 18201 current 8 28 4 current	history1 40 24 <1 2 9 54 999 147 13744 history1 17 103 7 history1 195893 ▲ 30405	history2 145 0 <1 <1 6 30 1140 100 15626 history2 6 21 <1 history2 98763 ▲ 10769 228 31



OIL ANALYSIS REPORT

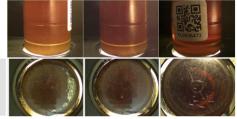




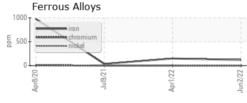
FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	2.00	1.47	1.22	1.736
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	MODER	LIGHT	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	MODER	LIGHT	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	history1	history2
Visc @ 40°C	cSt	ASTM D445	74	90.0	78.0	87.4
SAMPLE IMAGES		method	limit/base	current	history1	history2

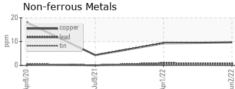
Color

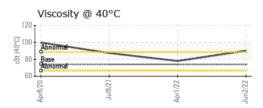


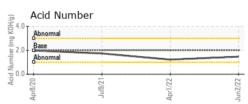


GRAPHS













Laboratory Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : KL0008008

Lab Number : 05567148 Unique Number : 10011548 Received : 13 Jun 2022 **Tested**

Diagnosed

: 15 Jun 2022

: 15 Jun 2022 - Don Baldridge

7550 W I20 ODESSA, TX US 79763 Contact: MIKE COMBDEN mcombden@citadeldrilling.com T: (780)955-5509

CITADEL DRILLING

Test Package : MOB 2 (Additional Tests: PrtCount) Certificate 12367 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)

Report Id: CITODETEX [WUSCAR] 05567148 (Generated: 07/02/2024 12:51:08) Rev: 1

Contact/Location: MIKE COMBDEN - CITODETEX

F: