

PROBLEM SUMMARY

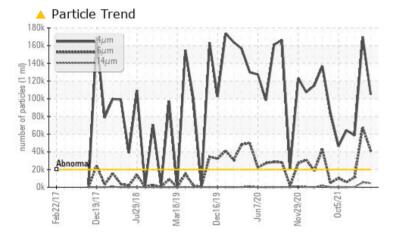
Area Cranes [450185704]

Crane - Fwd Slewing Gearbox #2 (S/N Sample Tag MA-04003-S8)

Component Gearbox

Fluid PETRO CANADA GEARLUBE TOS 80W90 (33 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. We recommend an early resample to monitor this condition.

PROBLEMATIC	TEST RESULT	S			
Sample Status			ABNORMAL	SEVERE	NORMAL
Particles >14µm	ASTM D7647	>640	<u> </u>	b 5458	402
Particles >21µm	ASTM D7647	>160	4 939	9 79	45
Oil Cleanliness	ISO 4406 (c)	>21/19/16	<u> </u>	• 25/23/20	23/21/16

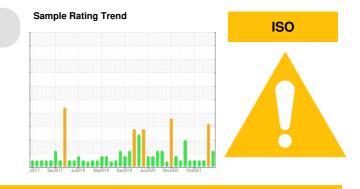
Customer Id: TERHAM Sample No.: PC Lab Number: 02582284 Test Package: MAR 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Kevin Marson +1 (289)291-4644 x4644 Kevin.Marson@wearcheck.com

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 gloria.gonzalez@wearcheck.com



RECOMMENI	DED ACTIONS			
Action	Status	Date	Done By	Description
Change Filter			?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.
Resample			?	We recommend an early resample to monitor this condition.
Filter Fluid			?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.

HISTORICAL DIAGNOSIS



02 May 2023 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation.All component wear rates are normal. There is a high amount of particulates (2 to 100 microns in size) present in the oil. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



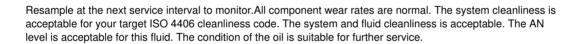
view report

29 Nov 2021 Diag: Kevin Marson

Resample at the next service interval to monitor.All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

27 Nov 2021 Diag: Kevin Marson









OIL ANALYSIS REPORT

Cranes [450185704] Machine Id Crane - Fwd Slewing Gearbox #2 (S/N Sample Tag MA-04003-S8)

Component Gearbox

PETRO CANADA GEARLUBE TOS 80W90 (33 LTR)

DIAGNOSIS

Recommendation

We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. We recommend an early resample to monitor this condition.

Wear

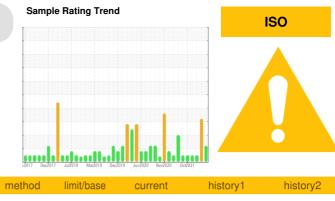
All component wear rates are normal.

Contamination

There is a moderate amount of particulates (2 to 100 microns in size) present in the oil.

Fluid Condition

The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



Sample NumberClient InfoPCPC0053014PC0040128Sample DateClient Info13 Aug 202022 Nov 2021Machine AgehrsClient Info00Oll AgehrsClient InfoN/AN/ASample StatusClient InfoN/AN/AN/ASample StatusTClient InfoN/AN/AN/ASample StatusTTentoN/AN/AN/APQASTM 0518/mStatusCurrentNickelNormalPQASTM 0518/m>10-1100IronppmASTM 0518/m>10-110ChromiumppmASTM 0518/m>1000SilverppmASTM 0518/m>5000SilverppmASTM 0518/m>60000CopperppmASTM 0518/m>60000Astm 0518/m>6000000Astm 0518/m>6000000Astm 0518/m>8800000Astm 0518/m>8800000Astm 0518/m>80-11<11<111Astm 0518/m>80-11<1111Astm 0518/m>80-11<1111Astm 0518/m>80-11000Astm 0518/m>8000 </th <th>SAMPLE INFORM</th> <th>IATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine AgehrsClient Info0000Oil ChangedClient InfoN/AN/AN/ASample StatusIImil/baseEVERENORMALWEAR METALSmethodImil/baseCurrentNistory!Nistory!PQASTM D518/r510131000IronppmASTM D518/r5101310010ChromiumppmASTM D518/r0000NickelpmASTM D518/r0001NickelpmASTM D518/r0001NickelpmASTM D518/r0001AuminumpmASTM D518/r50000CopperpmASTM D518/r50000AttimonypmASTM D518/r50000AttimonypmASTM D518/r50000AttimonypmASTM D518/r50000AttimonypmASTM D518/r50000AttimonypmASTM D518/r20000AttimonypmASTM D518/r20000AttimonypmASTM D518/r20000AttimonypmASTM D518/r10000AttimonypmASTM D518/r10000	Sample Number		Client Info		PC	PC0053014	PC0040128
Oil Age hrs Client Info N/A N/A N/A N/A Sample Status I Image Client Info N/A ABNORMAL SEVERE NORMAL WEAR METALS method Imit/base current history1 history2 PQ ASTM D5186m >150 13 10 0 0 Iron ppm ASTM D5186m >10 C1 0 <1 Nickel ppm ASTM D5186m >10 0 <1 0 Silver ppm ASTM D5186m >50 0 0 <1 0 Aluminum ppm ASTM D5186m >50 0 <1 1 0 Copper ppm ASTM D5186m >50 0 0 0 0 Cadmium ppm ASTM D5186m >50 0 0 0 0 Cadmium ppm ASTM D5186m >50 0 0 0 0 <t< th=""><th>Sample Date</th><th></th><th>Client Info</th><th></th><th>13 Aug 2023</th><th>02 May 2023</th><th>29 Nov 2021</th></t<>	Sample Date		Client Info		13 Aug 2023	02 May 2023	29 Nov 2021
Oil ChangedClient InfoN/AN/AN/AN/ASample StatusIImit/basecurrentFistory1NorMALWEAR METALSmethodlimit/basecurrenthistory1history2PQASTM D8184'0000IronppmASTM D5185(m)>150130100101ChromiumppmASTM D5185(m)>100<10<1NickelppmASTM D5185(m)>500000ItaniumppmASTM D5185(m)>550000LeadppmASTM D5185(m)>550000CopperppmASTM D5185(m)>560000AntimonyppmASTM D5185(m)>560000AntimonyppmASTM D5185(m)>560000CadmiumppmASTM D5185(m)>600000CadmiumppmASTM D5185(m)50000ASTM D5185(m)2000000ASTM D5185(m)2000000ASTM D5185(m)2116<16<17115150BariumppmASTM D5185(m)2<1<1<<1ASTM D5185(m)21<1<1<1<1ASTM D5185(m)2 <t< th=""><th>Machine Age</th><th>hrs</th><th>Client Info</th><th></th><th>0</th><th>0</th><th>0</th></t<>	Machine Age	hrs	Client Info		0	0	0
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iron ppm ASTM D5185(m) >150 13 10 10 Chromium ppm ASTM D5185(m) >10 <1 0 <1 Nickel ppm ASTM D5185(m) >10 0 <1 0 Silver ppm ASTM D5185(m) >5 0 0 0 Aluminum ppm ASTM D5185(m) >5 0 <1 0 Copper ppm ASTM D5185(m) >55 0 0 0 Antimony ppm ASTM D5185(m) >55 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 Boron ppm ASTM D5185(m) 2 188 35 175 Barium ppm ASTM D5185(m) 0 0	WEAR METALS	5	method	limit/base	current	history1	history2
Chromium ppm ASTM D5185(m) >10 <1	PQ		ASTM D8184*		0	0	0
Nickel ppm ASTM D5185(m) >10 0 <1	Iron	ppm	ASTM D5185(m)	>150	13	10	10
Titanium ppm ASTM D5185(m) 0 0 0 Silver ppm ASTM D5185(m) >5 0 0 0 Aluminum ppm ASTM D5185(m) >5 0 0 0 Lead ppm ASTM D5185(m) >65 0 <1 0 Copper ppm ASTM D5185(m) >80 <1 <1 <1 <1 Tin ppm ASTM D5185(m) >80 <1 <1 <1 <1 Antimony ppm ASTM D5185(m) >5 0 0 0 0 Vanadium ppm ASTM D5185(m) >5 0 0 0 0 Gadmium ppm ASTM D5185(m) 0 0 0 0 0 ADDTIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 2.0 0 0 0 Molybdenum ppm ASTM D5185(m) 2.0 0 2.1 1 Magnesium	Chromium	ppm	ASTM D5185(m)	>10	<1	0	<1
Silver ppm ASTM D5185(m) 0 0 <1 Aluminum ppm ASTM D5185(m) >5 0 0 0 Lead ppm ASTM D5185(m) >65 0 <1	Nickel	ppm	ASTM D5185(m)	>10	0	<1	0
Aluminum ppm ASTM D5185(m) >5 0 0 0 Lead ppm ASTM D5185(m) >65 0 <1	Titanium	ppm	ASTM D5185(m)		0	0	0
Lead ppm ASTM D5186m >655 0 <1 0 Copper ppm ASTM D5185(m) >80 <1	Silver	ppm	ASTM D5185(m)		0	0	<1
Copper ppm ASTM D5185(m) >80 <1 <1 <1 Tin ppm ASTM D5185(m) >8 0 0 0 Antimony ppm ASTM D5185(m) >5 0 0 0 Vanadium ppm ASTM D5185(m) >5 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current historyl historyl Boron ppm ASTM D5185(m) 240 188 35 175 Barium ppm ASTM D5185(m) 0.0 0 0 0 Magnesium ppm ASTM D5185(m) 0.0 0 0 14 14 1 Calcium ppm ASTM D5185(m) 1000 912 415 828 Zinc ppm ASTM D5185(m)	Aluminum	ppm	ASTM D5185(m)	>5	0	0	0
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Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) Q 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 240 188 35 175 Barium ppm ASTM D5185(m) 1 0 0 0 Molybdenum ppm ASTM D5185(m) 0.0 0 0 0 Magnesium ppm ASTM D5185(m) 0.0 0 <11 0 Magnesium ppm ASTM D5185(m) 0.0 912 415 828 Zinc ppm ASTM D5185(m) 1000 912 415 828 Sulfur ppm ASTM D5185(m) 19400 20996 11298 19780 Lithium ppm ASTM D5185(m) >20 3 2 2 2 Sodium ppm ASTM D5185(m) >	Antimony	ppm	ASTM D5185(m)	>5	0	0	0
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Boron ppm ASTM D5185(m) 240 188 35 175 Barium ppm ASTM D5185(m) 1 0 0 0 Molybdenum ppm ASTM D5185(m) 1 0 0 0 Manganese ppm ASTM D5185(m) 2 <1	Cadmium	ppm	ASTM D5185(m)		0	0	0
Barium ppm ASTM D5185(m) 1 0 0 0 Molybdenum ppm ASTM D5185(m) 0.0 0 0 0 Manganese ppm ASTM D5185(m) 0 <1 0 Magnesium ppm ASTM D5185(m) 2 <1 <1 <1 Calcium ppm ASTM D5185(m) 6 17 12 15 Phosphorus ppm ASTM D5185(m) 1000 912 415 828 Zinc ppm ASTM D5185(m) 1000 20996 11298 19780 Lithium ppm ASTM D5185(m) 19400 20996 11298 19780 Lithium ppm ASTM D5185(m) 20 3 2 2 Solicon ppm ASTM D5185(m) >20 3 2 2 Solicon ppm ASTM D5185(m) >20 2 1 2 Potassium ppm ASTM D5185(m) >20	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5/85(m) 0.0 0 0 0 Manganese ppm ASTM D5/85(m) 2 <1 <1 0 Magnesium ppm ASTM D5/85(m) 2 <1 <1 <1 Calcium ppm ASTM D5/85(m) 6 17 12 15 Phosphorus ppm ASTM D5/85(m) 1000 912 415 828 Zinc ppm ASTM D5/85(m) 1000 20996 11298 19780 Lithium ppm ASTM D5/85(m) 19400 20996 11298 19780 Lithium ppm ASTM D5/85(m) 19400 20996 11298 19780 Lithium ppm ASTM D5/85(m) 19400 20996 11298 19780 Solicon ppm ASTM D5/85(m) >20 3 2 2 2 Potassium ppm ASTM D5/85(m) >20 2 <1 2 2	Boron	ppm	ASTM D5185(m)	240	188	35	175
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Magnesium ppm ASTM D5185(m) 2 <1	Molybdenum	ppm	ASTM D5185(m)	0.0	0	0	0
Calcium ppm ASTM D5185(m) 6 17 12 15 Phosphorus ppm ASTM D5185(m) 1000 912 415 828 Zinc ppm ASTM D5185(m) 3 15 22 11 Sulfur ppm ASTM D5185(m) 19400 20996 11298 19780 Lithium ppm ASTM D5185(m) 19400 20996 11298 19780 Silicon ppm ASTM D5185(m) 19400 20996 11298 19780 Silicon ppm ASTM D5185(m) 20 3 2 2 2 Sodium ppm ASTM D5185(m) >20 3 2 2 2 Potassium ppm ASTM D5185(m) >20 2 <1	Manganese	ppm	ASTM D5185(m)		0	<1	0
Phosphorus ppm ASTM D5185(m) 1000 912 415 828 Zinc ppm ASTM D5185(m) 3 15 22 11 Sulfur ppm ASTM D5185(m) 19400 20996 11298 19780 Lithium ppm ASTM D5185(m) 19400 20996 11298 19780 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 3 2 2 Sodium ppm ASTM D5185(m) >20 3 2 2 Potassium ppm ASTM D5185(m) >20 2 <1 2 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >20000 104877 169718 58450 Particles >6µm ASTM D7647 >5000 41174 67987 11216 Particles >4µm ASTM D7647 6	Magnesium	ppm	ASTM D5185(m)	2	<1	<1	<1
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LithiumppmASTM D5185(m)<1	Zinc	ppm	ASTM D5185(m)	3	15	22	11
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Sulfur	ppm	ASTM D5185(m)	19400	20996	11298	19780
Silicon ppm ASTM D5185(m) >20 3 2 2 Sodium ppm ASTM D5185(m) 0 2 1 2 Potassium ppm ASTM D5185(m) >20 2 <1	Lithium	ppm	ASTM D5185(m)		<1	<1	<1
Sodium ppm ASTM D5185(m) 2 1 2 Potassium ppm ASTM D5185(m) >20 2 <1 2 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >20000 104877 169718 58450 Particles >6µm ASTM D7647 >5000 41174 67987 11216 Particles >14µm ASTM D7647 >640 4555 5458 402 Particles >21µm ASTM D7647 >160 939 979 45 Particles >38µm ASTM D7647 >40 10 3 0 Particles >71µm ASTM D7647 >10 3 1 0	CONTAMINAN	ГS	method	limit/base	current	history1	history2
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Potassium ppm ASTM D5185(m) >20 2 <1 2 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >20000 104877 169718 58450 Particles >6µm ASTM D7647 >5000 41174 67987 11216 Particles >14µm ASTM D7647 >640 4555 5458 402 Particles >21µm ASTM D7647 >160 939 979 45 Particles >38µm ASTM D7647 >40 10 3 0 Particles >71µm ASTM D7647 >10 3 1 0	Sodium		ASTM D5185(m)		2	1	2
Particles >4μm ASTM D7647 >20000 104877 169718 58450 Particles >6μm ASTM D7647 >5000 41174 67987 11216 Particles >14μm ASTM D7647 >640 ▲ 4555 \$5458 402 Particles >21μm ASTM D7647 >160 ▲ 939 ▲ 979 45 Particles >38μm ASTM D7647 >40 10 3 0 Particles >71μm ASTM D7647 >10 3 1 0	Potassium	ppm	ASTM D5185(m)	>20	2	<1	2
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Particles >6µm ASTM D7647 >5000 41174 67987 11216 Particles >14µm ASTM D7647 >640 ▲ 4555 ● 5458 402 Particles >21µm ASTM D7647 >160 ▲ 939 ▲ 979 45 Particles >38µm ASTM D7647 >40 10 3 0 Particles >71µm ASTM D7647 >10 3 1 0	Particles >4um		ASTM D7647	>20000	104877	169718	58450
Particles >14μm ASTM D7647 >640 ▲ 4555 ● 5458 402 Particles >21μm ASTM D7647 >160 ▲ 939 ▲ 979 45 Particles >38μm ASTM D7647 >40 10 3 0 Particles >71μm ASTM D7647 >10 3 1 0							
Particles >21μm ASTM D7647 >160 939 979 45 Particles >38μm ASTM D7647 >40 10 3 0 Particles >71μm ASTM D7647 >10 3 1 0							
Particles >38μm ASTM D7647 >40 10 3 0 Particles >71μm ASTM D7647 >10 3 0							
Particles >71μm ASTM D7647 >10 3 1 0							



🔺 Particle Count

🔺 Particle Trend

144

Jul29/1

)ec19/

Acid Number

Aar18/1

38/

214

Jec16/1

491,520 122,880

(m 30,720 7,680 1,920 39,720 1,920 480 1,920 480 120 30 30 30 30 8

> 200k (Tu 1) sapptped jo 100k 0k 0k

> > Feb22/

20

KOH/g)

her (mg)

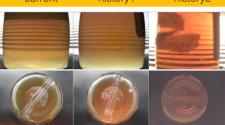
Pio 0.5

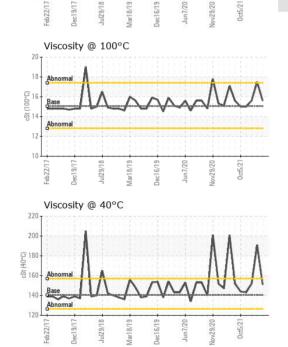
OIL ANALYSIS REPORT

FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	1.5	1.14	0.68	1.30
VISUAL		method	limit/base	current	history1	history2
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	VLITE	NONE	NONE
Debris	scalar	Visual*	NONE	VLITE	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 PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	140.3	151	191	152
Visc @ 100°C	cSt	ASTM D7279(m)	15.05	15.6	17.5	15.6
Viscosity Index (VI)	Scale	ASTM D2270*	109	105	98	105
SAMPLE IMAG	EC	method	limit/base	current	history1	history2



Bottom





: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Laboratory CALA Sample No. : PC Received : 13 Sep 2023 Lab Number : 02582284 Diagnosed : 15 Sep 2023 ISO 17025:2017 Accredited Laboratory Unique Number : 5643349 Diagnostician : Kevin Marson Test Package : MAR 2 (Additional Tests: KV100, PQ, PrtCount, VI) To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

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