

OIL ANALYSIS REPORT

Area Nashville [Nashville] Hydraulic - Steering

Hydraulic System

AW HYDRAULIC OIL ISO 32 (110 GAL)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor. (Customer Sample Comment: Dparnell)

Wear

All component wear rates are normal.

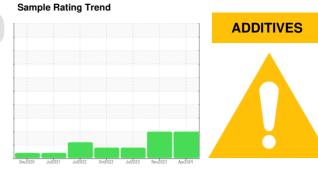
Contamination

There is a high amount of silt (particulates < 6 microns in size) present in the oil.

Fluid Condition

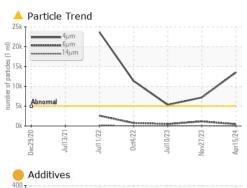
Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

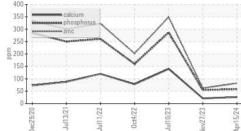
Sample Date Client Info 15 Apr 2024 27 Nov 2023 10 Jul 2023 Machine Age hrs Client Info 0 117 0 Oil Age hrs Client Info 2724 117 11304 Oil Changed Client Info 2724 117 11304 Sample Status Image AENORMAL ATTENTION ATTENTION WEAR METALS method Imit/base current history1 history2 Iron ppm ASTM 05185m >20 2 <1 0 0 Nickel ppm ASTM 05185m >20 2 0 0 0 Auminum ppm ASTM 05185m >20 2 0 0 0 Auminum ppm ASTM 05185m >20 <1 0 0 0 Auminum ppm ASTM 05185m >20 <1 0 0 0 Auminum ppm ASTM 05185m >20 <1			Dec2020	Jul2021 Jul2022	Oct2022 Jul2023 Nov2023	Apr2024	
Sample Date Client Info 15 Apr 2024 27 Nov 2023 10 Jul 2023 Machine Age hrs Client Info 0 117 0 Oil Age hrs Client Info 2724 117 11304 Oil Changed Client Info 270 9 0 14 Chromium ppm ASTM 05155m 20 2 <1 0 0 Nickel ppm ASTM 05155m 20 2 0 0 0 Lead ppm ASTM 05155m 20 2 0 0 0 Vanadium ppm ASTM 05155m 20 1 0 0 0 Vanadium ppm ASTM 05155m 2 1 0 2 Vanadium	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 0 117 0 Oil Age hrs Client Info 2724 117 1304 Sample Status Client Info ABNORMAL ATTENTION ATTENTION WEAR METALS method limit/base current history1 history1 Iron ppm ASTM DS185n >20 9 0 14 Chromium ppm ASTM DS185n >20 2 <1	Sample Number		Client Info		WC0874897	WC0805241	WC0769194
Oil Age hrs Client Info 2724 117 11304 Oil Changed Client Info Filtered Not Changd Filtered Sample Status method limit/base current history1 ATTENTION WEAR METALS method limit/base current history2 ATTENTION Iron ppm ASTM D5185m >20 9 0 14 Chromium ppm ASTM D5185m >20 2 -1 -1 Nickel ppm ASTM D5185m >20 2 0 0 Auminum ppm ASTM D5185m >20 2 0 0 Gopper ppm ASTM D5185m >20 5 2 7 1 Tin ppm ASTM D5185m >20 <1	Sample Date		Client Info		15 Apr 2024	27 Nov 2023	10 Jul 2023
Oli Changed Client Info Filtered Not Changed Filtered Sample Status Image Image Current ATTENTION ATTENTION WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 9 0 14 Chromium ppm ASTM D5185m >20 2 <1	Machine Age	hrs	Client Info		0	117	0
Sample Status method Imit/base current history1 ATTENTION WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185n >20 9 0 14 Chromium ppm ASTM D5185n >20 2 <1	Oil Age	hrs	Client Info		2724	117	11304
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185n >20 9 0 14 Chromium ppm ASTM D5185n >20 2 <1	Oil Changed		Client Info		Filtered	Not Changd	Filtered
Iron ppm ASTM D5185m >20 9 0 14 Chromium ppm ASTM D5185m >20 2 <1	Sample Status				ABNORMAL	ATTENTION	ATTENTION
Image ASTM DS185m >20 2 <1 <1 Nickel ppm ASTM DS185m >20 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >20 <1 0 0 Titanium ppm ASTM D5185m 0 0 0 Silver ppm ASTM D5185m >20 2 0 0 Aluminum ppm ASTM D5185m >20 2 0 0 Copper ppm ASTM D5185m >20 5 2 7 Tin ppm ASTM D5185m >20 <1	Iron	ppm	ASTM D5185m	>20	9	0	14
Titanium ppm ASTM D5185m Silver ppm ASTM D5185m S20 2 0 0 Aluminum ppm ASTM D5185m >20 2 0 0 Lead ppm ASTM D5185m >20 5 2 7 Tin ppm ASTM D5185m >20 <1	Chromium	ppm	ASTM D5185m	>20	2	<1	<1
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Aluminum ppm ASTM D5185m >20 2 0 0 Lead ppm ASTM D5185m >20 <1	Titanium	ppm	ASTM D5185m		<1	0	0
Lead ppm ASTM D5185m >20 <1 0 0 Copper ppm ASTM D5185m >20 5 2 7 Tin ppm ASTM D5185m >20 <1	Silver	ppm	ASTM D5185m		0	0	0
Copper ppm ASTM D5185m >20 5 2 7 Tin ppm ASTM D5185m >20 <1	Aluminum	ppm	ASTM D5185m	>20	2	0	0
Copper ppm ASTM D5185m >20 5 2 7 Tin ppm ASTM D5185m >20 <1	Lead		ASTM D5185m	>20	<1	0	0
Tin ppm ASTM D5185m >20 <1 0 0 Vanadium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 5 <1 0 4 Barium ppm ASTM D5185m 5 <1 0 4 Barium ppm ASTM D5185m 5 <1 0 2 Magnese ppm ASTM D5185m 5 <1 0 2 Magnesium ppm ASTM D5185m 200 26 21 140 Phosphorus ppm ASTM D5185m 200 58 55 287 Zinc ppm ASTM D5185m 200 62 349 349 Sulfur ppm ASTM D5185m 250 1 10 <1 Sodium ppm ASTM D5185m >15 1 0 <1 Sodium ppm ASTM D5185m >20 1 0 <1 </td <td>Copper</td> <td></td> <td>ASTM D5185m</td> <td>>20</td> <th>5</th> <td>2</td> <td>7</td>	Copper		ASTM D5185m	>20	5	2	7
Vanadium ppm ASTM D5185m							0
Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 5 <1 0 4 Barium ppm ASTM D5185m 5 <1 0 4 Manganese ppm ASTM D5185m 5 <1 0 2 Manganese ppm ASTM D5185m 20 <1 <1 <1 Maganesium ppm ASTM D5185m 200 26 21 140 Phosphorus ppm ASTM D5185m 200 58 55 287 Zinc ppm ASTM D5185m 370 82 62 349 Sulfur ppm ASTM D5185m 2500 174 175 1279 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 20 1 0 <td>Vanadium</td> <td></td> <td></td> <td></td> <th></th> <td>0</td> <td>0</td>	Vanadium					0	0
Boron ppm ASTM D5185m 5 <1 0 4 Barium ppm ASTM D5185m 5 0 0 0 Molybdenum ppm ASTM D5185m 5 <1							
Barium ppm ASTM D5185m 5 0 0 0 Molybdenum ppm ASTM D5185m 5 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 5 <1 0 2 Manganese ppm ASTM D5185m 20 0 <1	Boron	ppm	ASTM D5185m	5	<1	0	4
Marganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 25 2 <1	Barium	ppm	ASTM D5185m	5	0	0	0
Magnesium ppm ASTM D5185m 25 2 <1 5 Calcium ppm ASTM D5185m 200 26 21 140 Phosphorus ppm ASTM D5185m 300 58 55 287 Zinc ppm ASTM D5185m 370 82 62 349 Sulfur ppm ASTM D5185m 2500 174 175 1279 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 10 <1	Molybdenum	ppm	ASTM D5185m	5	<1	0	2
Calcium ppm ASTM D5185m 200 26 21 140 Phosphorus ppm ASTM D5185m 300 58 55 287 Zinc ppm ASTM D5185m 370 82 62 349 Sulfur ppm ASTM D5185m 2500 174 175 1279 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 10 <1	Manganese	ppm	ASTM D5185m		0	<1	<1
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Zinc ppm ASTM D5185m 370 82 62 349 Sulfur ppm ASTM D5185m 2500 174 175 1279 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 10 <1	Calcium	ppm	ASTM D5185m	200	26	21	140
Sulfur ppm ASTM D5185m 2500 174 175 1279 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 10 <1 Sodium ppm ASTM D5185m >15 1 10 <1 Potassium ppm ASTM D5185m >20 1 0 0 Water % ASTM D6304 >0.05 0.003 0.001 0.003 ppm ASTM D6304 >500 36 14 38.6 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 13521 7201 5325 Particles >6µm ASTM D7647 >1300 462 1171 490 Particles >1µm ASTM D7647 >40 2 19 12 Particles >21µm ASTM D7647 >40 2 19 12 <	Phosphorus	ppm	ASTM D5185m	300	5 8	55	287
Sulfur ppm ASTM D5185m 2500 174 175 1279 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 10 <1 Sodium ppm ASTM D5185m >15 1 10 <1 Potassium ppm ASTM D5185m >20 1 0 0 Water % ASTM D6304 >0.05 0.003 0.001 0.003 ppm Water ppm ASTM D6304 >500 36 14 38.6 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 13521 7201 5325 Particles >6µm ASTM D7647 >1300 462 1171 490 Particles >1µm ASTM D7647 >10 0 1 1 Particles >38µm ASTM D7647 30 0 0	Zinc	ppm	ASTM D5185m	370	82	62	349
Silicon ppm ASTM D5185m >15 1 10 <1 Sodium ppm ASTM D5185m >20 1 0 0 Potassium ppm ASTM D5185m >20 1 0 0 Water % ASTM D6304 >0.05 0.003 0.001 0.003 ppm Water ppm ASTM D6304 >500 36 14 38.6 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 13521 7201 5325 Particles >6µm ASTM D7647 >1300 462 1171 490 Particles >14µm ASTM D7647 >160 8 65 30 Particles >21µm ASTM D7647 >40 2 19 12 Particles >38µm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16	Sulfur		ASTM D5185m	2500	174	175	1279
Sodium ppm ASTM D5185m 0 1 <1 Potassium ppm ASTM D5185m<>20 1 0 0 Water % ASTM D6304 >0.05 0.003 0.001 0.003 ppm Water ppm ASTM D6304 >500 36 14 38.6 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 ▲ 13521 7201 5325 Particles >6µm ASTM D7647 >100 462 1171 490 Particles >14µm ASTM D7647 >160 8 65 30 Particles >21µm ASTM D7647 >10 0 1 1 Particles >38µm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	CONTAMINANTS		method	limit/base	current	history1	history2
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FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 ▲ 13521 7201 5325 Particles >6µm ASTM D7647 >1300 462 1171 490 Particles >6µm ASTM D7647 >160 8 65 30 Particles >14µm ASTM D7647 >160 8 65 30 Particles >21µm ASTM D7647 >40 2 19 12 Particles >38µm ASTM D7647 >10 0 1 1 Particles >71µm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	Water	%	ASTM D6304	>0.05	0.003	0.001	0.003
Particles >4μm ASTM D7647 >5000 ▲ 13521 7201 5325 Particles >6μm ASTM D7647 >1300 462 1171 490 Particles >14μm ASTM D7647 >160 8 65 30 Particles >21μm ASTM D7647 >40 2 19 12 Particles >21μm ASTM D7647 >10 0 1 1 Particles >38μm ASTM D7647 >3 0 0 0 Particles >71μm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	ppm Water	ppm	ASTM D6304	>500	36	14	38.6
Particles >6µm ASTM D7647 >1300 462 1171 490 Particles >14µm ASTM D7647 >160 8 65 30 Particles >21µm ASTM D7647 >40 2 19 12 Particles >38µm ASTM D7647 >10 0 1 1 Particles >38µm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	FLUID CLEANLIN	ESS	method	limit/base	current	history1	history2
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Particles >21μm ASTM D7647 >40 2 19 12 Particles >38μm ASTM D7647 >10 0 1 1 Particles >38μm ASTM D7647 >30 0 0 0 Particles >71μm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	Particles >6µm		ASTM D7647	>1300	462	1171	490
Particles >38μm ASTM D7647 >10 0 1 1 Particles >71μm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	Particles >14µm		ASTM D7647	>160	8	65	30
Particles >71μm ASTM D7647 >3 0 0 0 Oil Cleanliness ISO 4406 (c) >19/17/14 ▲ 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	Particles >21µm		ASTM D7647	>40	2	19	12
Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2	Particles >38µm		ASTM D7647	>10	0	1	1
Oil Cleanliness ISO 4406 (c) >19/17/14 21/16/10 20/17/13 20/16/12 FLUID DEGRADATION method limit/base current history1 history2			ASTM D7647	>3	0	0	0
					21/16/10	20/17/13	20/16/12
Acid Number (AN) mg KOH/g ASTM D8045 0.57 0.082 0.108 0.25	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Acid Number (AN)	mg KOH/g	ASTM D8045	0.57	0.082	0.108	0.25

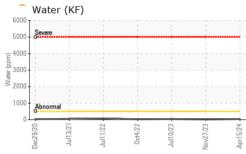


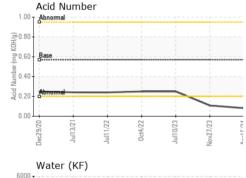


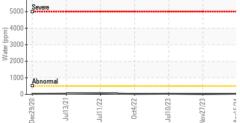
OIL ANALYSIS REPORT



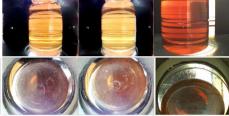




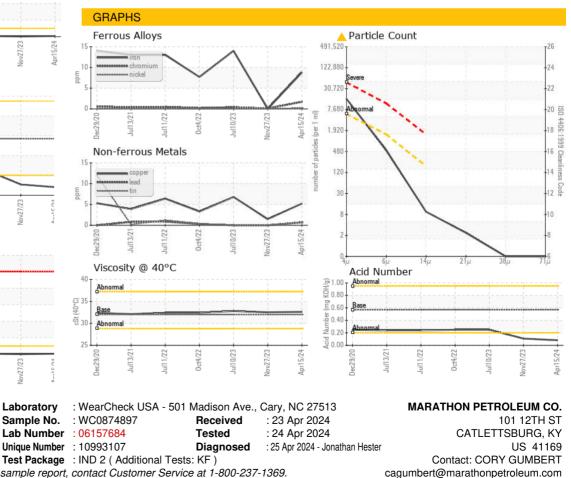




VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	LIGHT
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.05	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	32	32.6	32.5	32.8
SAMPLE IMAGES		method	limit/base	current	history1	history2
Color					•	



Bottom



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: MARCAT [WUSCAR] 06157684 (Generated: 04/25/2024 15:27:13) Rev: 1

Certificate 12367

Submitted By: M/V NASHVILLE

Page 2 of 2

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