

### **OIL ANALYSIS REPORT**

# GM Seattle Off Raod Shop [GM Seattle Off Raod Shop] 28-433

Transmission (Auto)

LIEBHERR GEAR MF 80W (--- GAL)

#### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: Top Up Amount: 3 gallons )

#### Wear

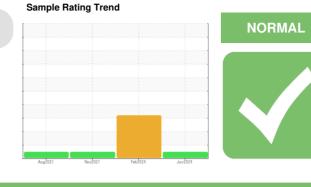
All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the fluid. The amount and size of particulates present in the system are acceptable.

#### Fluid Condition

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



SAMPLE INFORM	IATION	method	limit/base	current	history1	history2	
Sample Number		Client Info		PE0003028	PE0003374	PE12291090	
Sample Date		Client Info		04 Jun 2024	13 Feb 2024	02 Nov 2021	
Machine Age	hrs	Client Info		5353	4699	1165	
Oil Age	hrs	Client Info		654	4699	1165	
Oil Changed		Client Info		Oil Added	Changed	Not Changd	
Sample Status				NORMAL	ATTENTION	NORMAL	
CONTAMINATION		method	limit/base	ourroat			
	N			current	history1	history2	
Water		WC Method	>0.1	NEG	NEG	NEG	
WEAR METALS		method	limit/base	current	history1	history2	
PQ		ASTM D8184	>50	21	17		
Iron	ppm	ASTM D5185m	>160	15	17	14	
Chromium	ppm	ASTM D5185m	>5	<1	<1	0	
Nickel	ppm	ASTM D5185m	>5	0	0	0	
Titanium	ppm	ASTM D5185m		<1	0	0	
Silver	ppm	ASTM D5185m	>5	0	0	<1	
Aluminum	ppm	ASTM D5185m	>50	2	2	1	
Lead	ppm	ASTM D5185m	>50	0	8	1	
Copper	ppm	ASTM D5185m	>225	1	5	3	
Tin	ppm	ASTM D5185m	>10	0	0	0	
Antimony	ppm	ASTM D5185m				0	
Vanadium	ppm	ASTM D5185m		0	0	0	
Cadmium	ppm	ASTM D5185m		<1	0		
ADDITIVES		method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185m		22	0	108	
Barium	ppm	ASTM D5185m		<1	0	0	
Molybdenum	ppm	ASTM D5185m		<1 <1	0	0	
Manganese	ppm	ASTM D5185m		~1	<1		
					0	7	
Magnesium	ppm	ASTM D5185m		16	6	7	
Calcium	ppm ppm	ASTM D5185m ASTM D5185m		16 3430	829	3829	
Calcium Phosphorus	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		16 3430 1345	<ul><li>829</li><li>464</li></ul>	3829 1295	
Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		16 3430 1345 1577	<ul><li>829</li><li>464</li><li>500</li></ul>	3829 1295 1642	
Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		16 3430 1345	<ul><li>829</li><li>464</li></ul>	3829 1295 1642	
Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	16 3430 1345 1577	<ul><li>829</li><li>464</li><li>500</li></ul>	3829 1295 1642	
Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	16 3430 1345 1577 7434	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> </ul>	3829 1295 1642	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method		16 3430 1345 1577 7434 current	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> </ul>	3829 1295 1642  history2	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>20	16 3430 1345 1577 7434 current 5	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> </ul>	3829 1295 1642  history2 8	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>20	16 3430 1345 1577 7434 current 5 0	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> </ul>	3829 1295 1642  history2 8 8 8	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>20 >20	16 3430 1345 1577 7434 current 5 0 2	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> </ul>	3829 1295 1642  history2 8 8 8 2	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>20 >20 limit/base >10000	16 3430 1345 1577 7434 <u>current</u> 5 0 2 2 <u>current</u> 1901	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> <li>history1</li> <li>12693</li> </ul>	3829 1295 1642  history2 8 8 8 2 2 history2 	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>20 >20 limit/base >10000 >2500	16 3430 1345 1577 7434 current 5 0 2 2 current 1901 321	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> <li>history1</li> <li>12693</li> <li>2779</li> </ul>	3829 1295 1642  history2 8 8 8 2 2 history2	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7647 ASTM D7647 ASTM D7647	>20 >20 limit/base >10000 >2500 >320	16 3430 1345 1577 7434 <u>current</u> 5 0 2 <u>current</u> 1901 321 16	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> <li>history1</li> <li>12693</li> <li>2779</li> <li>246</li> </ul>	3829 1295 1642  history2 8 8 8 2 2 history2  	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7647 ASTM D7647 ASTM D7647	>20 >20 <b>limit/base</b> >10000 >2500 >320 >80	16 3430 1345 1577 7434 <u>current</u> 5 0 2 2 <u>current</u> 1901 321 16 3	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> <li>12693</li> <li>2779</li> <li>246</li> <li>74</li> </ul>	3829 1295 1642  history2 8 8 8 2 2 history2 	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >6µm Particles >21µm Particles >38µm	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	>20 >20 limit/base >10000 >2500 >320 >80 >20	16 3430 1345 1577 7434 <u>current</u> 5 0 2 2 <u>current</u> 1901 321 16 3 0	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> <li>12693</li> <li>2779</li> <li>246</li> <li>74</li> <li>3</li> </ul>	3829 1295 1642  history2 8 8 8 2 2 history2   	
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium FLUID CLEANLIN Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7647 ASTM D7647 ASTM D7647	>20 >20 <b>limit/base</b> >10000 >2500 >320 >80	16 3430 1345 1577 7434 <u>current</u> 5 0 2 2 <u>current</u> 1901 321 16 3	<ul> <li>829</li> <li>464</li> <li>500</li> <li>2491</li> <li>history1</li> <li>6</li> <li>1</li> <li>&lt;1</li> <li>history1</li> <li>12693</li> <li>2779</li> <li>246</li> <li>74</li> </ul>	3829 1295 1642  history2 8 8 8 2 2 history2  	



## **OIL ANALYSIS REPORT**

80 <del>.</del>	PQ	FLU	JID DEGRADA	TION	method	
70-	Severe	Acid	Number (AN)	mg KOH/g	ASTM D8045	
60 - 50 -	Abnormal	VIS	UAL		method	
40 30 -		White	e Metal	scalar	*Visual	
20 -		Yello	w Metal	scalar	*Visual	
10-		Preci	pitate	scalar	*Visual	
01	724 -			scalar	*Visual	
	Feb 13/24	FZ/Funn Debri	S	scalar	*Visual	
	_	Sand	/Dirt	scalar	*Visual	
	Particle Trend	Appe	arance	scalar	*Visual	
	4μm	Odor		scalar	*Visual	
k -	Abnomal 14µm		sified Water	scalar	*Visual	
4			Water	scalar	*Visual	
ł						Ì
( - ( - ( -			JID PROPERTI		method	
ĺ		Visc	@ 40°C	cSt	ASTM D445	
	Aug20/21 Nov2/21 Feb13/24	SA	MPLE IMAGES		method	
	Au N	-				
	Viscosity @ 40°C	Color				
ľ	Abnormal					
1	Base					
0 +						
5		Botto	m			
) -	Abnormal	-				
5 -						i
01	21 + -	4	APHS			
	Aug20/21 Nov2/21 Feb13/24	20 Ter	rous Alloys			
	e E	15-	iron			
	PQ	E 10 -	nickel			
0 ]	Severe	5				
0-	Ţ	0	-		54	H
1	Abnormal	Aug20/2	Nov2/21		Feb 13/24	
0 - 0 -					Ĵ.	
		10 T	n-ferrous Metals			
0+			copper		~	
0 L	24 +	c d 5-	in in it in	Contraction of the local division of the loc		
	Feb 13/24		and the second	and the second se		
		0	21		24	-
kт	Particle Trend	Aug20/	Nov2/2		Feb 13/24	
					ц	
)k -	Abnormal_14µm	VIS 70 T Abn	cosity @ 40°C mmal			
3k -		Base				
6k -		(0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,00) (0,0)) (0,0) (0,0)) (0,0) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0)) (0,0) (0,0				
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6 <b>7</b> 0	Statements of conform					

NONE NORML NORML NORML NORML NORML NORML NEG NEG >0.1 NEG NEG 61.6 48.1 43.12 no image no image Particle Count 491,520 122,88 30.72

0.69

NONE

1.68

1.951

NONE

NONE

Jun4/24

Jun4/24 -

#### 20 8 7 68 4406:1999 Cle (per 1 1,920 cles 480 120 14 12 Cod 30 14 21 Acid Number ber (mg KOH/g) JE 0.5 Acid Feb13/24 -Nov2/21 un4/24 Aug20/2

Cary, NC 27513 Gary Merlino Construction - Off Road Shop : 14 Jun 2024 9125 10TH AVE SOUTH : 18 Jun 2024 SEATTLE, WA US 98108 : 18 Jun 2024 - Angela Borella PQ, PrtCount, SCREEN) Contact: Jesse Patterson 1369. oilsamples@gmccinc.com \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: 1(866)292-1303 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F:

Submitted By: Stoneway Concrete - Seattle - Jesse Patterson