



RECOMMENDATION

LIEBHERR R945 058083-1866

Diesel Engine

DIESEL ENGINE OIL SAE 40 (--- GAL)

Resample at the next service interval to monitor. The fluid was not specified, however, a fluid match indicates that this fluid is (GENERIC) DIESEL ENGINE OIL SAE 40. Please confirm.

W	ΗA	R

Metal levels are typical for a new component breaking in.

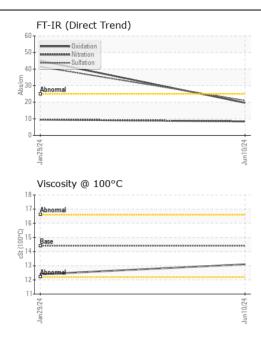
CONTAMINATION

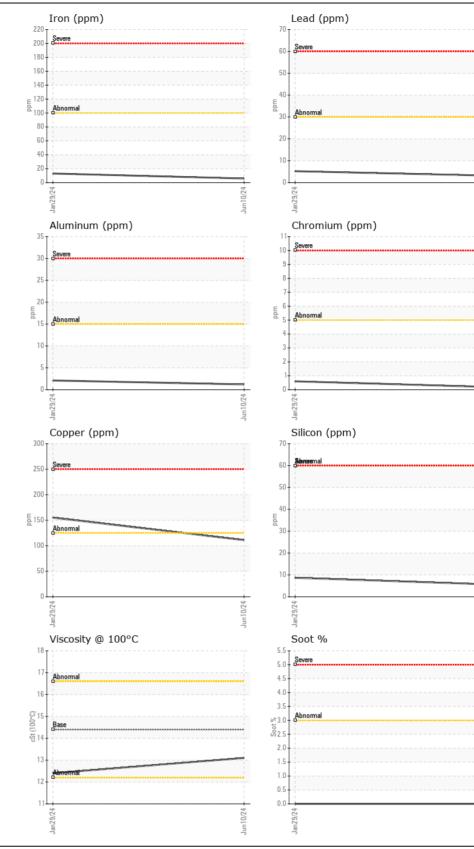
There is no indication of any contamination in the oil.

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The condition of the oil is acceptable for the time in service.

TestUOMMethodLimitAnCurrentHistory1History2Sample NumberClient InfoIH292910229.Jan 20244Sample DateClient InfoI9134444Machine AgehrsClient InfoI9134444Gil AgehrsClient InfoI00Filter AgehrsClient InfoIChangedChangedOll ChangedClient InfoIN/AN/AIFilter ChangedClient InfoN/AN/AISample StatusClient InfoNNORMALIIronppmASTMD5185(m)>5C1NickelppmASTMD5185(m)>50JitaniumppmASTMD5185(m)>300AluminumppmASTMD5185(m)>5C1AluminumppmASTMD5185(m)>5C1YanadiumppmASTMD5185(m)>5C1YanadiumppmASTMD5185(m)>5C1YanadiumppmASTMD5185(m)>5C12YanadiumppmASTMD5185(m)>5C1YanadiumppmASTMD5185(m)>20C12YanadiumppmASTMD5185(m)>20C12Yanad							
Sample DateClient InfoID Jun 202429 Jan 2024Machine AgehrsClient Info913444Oil AgehrsClient Info00Filter AgehrsClient InfoChangedChangedOil ChangedClient InfoN/AN/AN/AFilter ChangedClient InfoN/AN/AN/AFilter ChangedClient InfoN/AN/AN/ASample StatusVNORINALNORINALIronppmASTMD5165(m)>50C1NickelppmASTMD5165(m)>500NickelppmASTMD5165(m)>500AluminumppmASTMD5165(m)>30300AluminumppmASTMD5165(m)>50C1VanadiumppmASTMD5165(m)>50C1NadiumppmASTMD5165(m)>50C1VanadiumppmASTMD5165(m)>50C1NadiumppmASTMD5165(m)>50C1VanadiumppmASTMD5165(m)>50C1NadiumppmASTMD5165(m)>20C1SoliconppmASTMD5165(m)>20C1 <th>Test</th> <th>UOM</th> <th>Method</th> <th>Limit/Abn</th> <th>Current</th> <th>History1</th> <th>History2</th>	Test	UOM	Method	Limit/Abn	Current	History1	History2
Machine AgehrsClient Info913444Oil AgehrsClient Info00Filter AgehrsClient Info00Oil ChangedClient InfoN/AN/AFilter Changed0Client InfoN/AN/ASample StatusVClient InfoN/AN/AIronppmASTM D5185(m>100613NickelppmASTM D5185(m>50<1NickelppmASTM D5185(m>50SilverppmASTM D5185(m>300AluminumppmASTM D5185(m>3035LeadppmASTM D5185(m>3035VanadiumppmASTM D5185(m>50<1YanadiumppmASTM D5185(m>503SiliconppmASTM D5185(m>5069PotassiumppmASTM D5185(m>20<12SulfationAbs/cmASTM D5185(m>20<12SulfationAbs/cmASTM D5185(m>20<12SulfationAbs/cmASTM D5185(m20<12SulfationAbs/cmASTM D5185(m20<12SulfationAbs/cmASTM D518	Sample Number		Client Info		LH0291012	LH0278788	
Oil Age Filter AgehrsClient Info00Filter AgehrsClient Info00Oil ChangedClient InfoN/AN/AN/AFilter ChangedQClient InfoN/AN/AN/ASample StatusNORMALNORMALIronppmASTM D5186(m)>100613ChromiumppmASTM D5186(m)>5QNickelppmASTM D5186(m)>5QSilverppmASTM D5186(m)>3Q0AluminumppmASTM D5186(m)>3G0AgeppmASTM D5186(m)>112LeadppmASTM D5186(m)>5VanadiumppmASTM D5186(m)>50SiliconppmASTM D5186(m)>20FuelWC Method>0.2NEGNEGWaterQWC Method>0.2NEGSolitonppmASTM D518(m)>20SulfationAbs/rmASTM D518(m)>20SulfationAbs/rmASTM D518(m)>20SulfationAbs/rmASTM D518(m)>20NEGSulfationAbs/rmASTM D518	Sample Date		Client Info		10 Jun 2024	29 Jan 2024	
Filter Age Filter AgeIntoClient InfoOOOil ChangedClient InfoNANANAFilter ChangedClient InfoNANANASample StatusNORMALNORMALIronppmASTM05186(m)>50613NickelppmASTM05186(m)>50<1NickelppmASTM05186(m)>50<1SilverppmASTM05186(m)>300AluminumppmASTM05186(m)>3035QapperppmASTM05186(m)>50<1<1VanadiumppmASTM05186(m)>50<1<1VanadiumppmASTM05186(m)>50<1<1SiliconppmASTM05186(m)>20<12SulfacionppmASTM05186(m)>20<12WaterVC Method>.2NEGNEGSoliycolWC Method>.2NEGNEGSulfationAbs/rmASTM07844>3000Soliycal%ASTM07844>3000SulfationAbs/rmASTM07844>300SulfationAbs/rmASTM07844>300SulfationAbs/rm <td< th=""><th>Machine Age</th><td>hrs</td><td>Client Info</td><td></td><th>913</th><td>444</td><td></td></td<>	Machine Age	hrs	Client Info		913	444	
Oli ChangedClient InfoChangedChangedFilter ChangedClient InfoN/AN/AN/ASample StatusNORMALNORMALNORMALIronppmASTM D5186/m>1006113NickelppmASTM D5186/m>50<1NickelppmASTM D5186/m>50<1SilverppmASTM D5186/m>300AluminumppmASTM D5186/m>1512LeadppmASTM D5186/m>125111155YanadiumppmASTM D5186/m>5069VanadiumppmASTM D5186/m>69SiliconppmASTM D5186/m>20<12FuelWC Method>0.2NEGNEGWaterQWMSTM D5186/m>20<1.0<SulfationAbs/cmASTM D7624>20REGNEGSulfationAbs/cmASTM D5186/m21.0A1.4SulfationAbs/cmASTM D5186/m>3000SulfationAbs/cmASTM D5186/m20REGNEGSulfationAbs/cmASTM D5186/m3000SulfationAbs/cmASTM D5186/m20REGS	Oil Age	hrs	Client Info		0	0	
Filter Changed Sample Status Client Info N/A N/A N/A Iron ppm ASTM DS185(m) >100 6 13 Iron ppm ASTM DS185(m) >5 <1 <1 Nickel ppm ASTM DS185(m) >5 0 <1 Nickel ppm ASTM DS185(m) >5 0 <1 Nickel ppm ASTM DS185(m) >3 0 0 Silver ppm ASTM DS185(m) >30 3 5 Lead ppm ASTM DS185(m) >11 155 1 Vanadium ppm ASTM DS185(m) >5 <1 <1 Vanadium ppm ASTM DS185(m) >50 <1 <1 Vanadium ppm ASTM DS185(m) >20 <1 <1 Vanadium ppm ASTM DS185(m) >20 <t< th=""><th>Filter Age</th><th>hrs</th><th>Client Info</th><th></th><th>0</th><th>0</th><th></th></t<>	Filter Age	hrs	Client Info		0	0	
Sample Status NORMAL NORMAL NORMAL Iron ppm ASTM DS185(m) >100 6 133 Chromium ppm ASTM DS185(m) >5 0 <1 Nickel ppm ASTM DS185(m) >5 0 <1 Titanium ppm ASTM DS185(m) >3 0 0 Aluminum ppm ASTM DS185(m) >3 0 0 Aluminum ppm ASTM DS185(m) >15 1 2 Lead ppm ASTM DS185(m) >15 111 155 Vanadium ppm ASTM DS185(m) >20 <1 <1 Vanadium ppm ASTM DS185(m) >20 <1 2 Vanadium ppm ASTM DS185(m) >20 <1 2 Vanadium ppm ASTM DS185(m) >20 1	Oil Changed		Client Info		Changed	Changed	
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Chromium ppm ASTM D5185(m) >5 <1	Sample Status				NORMAL	NORMAL	
Chromium ppm ASTM D5185(m) >5 <1							
Nickel ppm ASTM D5185(m) >5 0 <1	-	ppm	()				
Titanium ppm ASTM D5185(m) 0 0 Silver ppm ASTM D5185(m) >3 0 0 Aluminum ppm ASTM D5185(m) >1 2 Lead ppm ASTM D5185(m) >30 3 5 Copper ppm ASTM D5185(m) >125 111 155 Tin ppm ASTM D5185(m) >5 <1 <1 Vanadium ppm ASTM D5185(m) >60 6 9 Vanadium ppm ASTM D5185(m) >60 6 9 Vanadium ppm ASTM D5185(m) >20 <1 2 Vanadium ppm ASTM D5185(m) >20 <1 2 Silicon ppm ASTM D5185(m) >20 <1 0 Water WC Method >0.2 NEG <		ppm	ASTM D5185(m)	>5			
Silver ppm ASTM D5185(m) >3 0 0 Aluminum ppm ASTM D5185(m) >15 1 2 Lead ppm ASTM D5185(m) >30 3 5 Copper ppm ASTM D5185(m) >125 111 155 Tin ppm ASTM D5185(m) >5 <1	Nickel	ppm		>5	0	<1	
Aluminum ppm ASTM D5185(m) >15 1 2 Lead ppm ASTM D5185(m) >30 3 5 Copper ppm ASTM D5185(m) >125 111 155 Tin ppm ASTM D5185(m) >5 <1 <1 Vanadium ppm ASTM D5185(m) >60 6 9 Vanadium ppm ASTM D5185(m) >60 6 9 Vanadium ppm ASTM D5185(m) >60 6 9 Vanadium ppm ASTM D5185(m) >20 <1 2 Vanadium ppm ASTM D5185(m) >20 <1 2 Silicon ppm ASTM D5185(m) >20 <1 2 Water WC Method >0 0 0 Sot % ASTM D7844* >3 0 0 </th <th>Titanium</th> <td>ppm</td> <td>ASTM D5185(m)</td> <td></td> <th>0</th> <td>0</td> <td></td>	Titanium	ppm	ASTM D5185(m)		0	0	
Lead ppm ASTM D5185(m) >30 3 5 Copper ppm ASTM D5185(m) >125 111 155 Tin ppm ASTM D5185(m) >5 <1 <1 Vanadium ppm ASTM D5185(m) >50 6 9 Vanadium ppm ASTM D5185(m) >60 6 9 Silicon ppm ASTM D5185(m) >60 6 9 Potassium ppm ASTM D5185(m) >20 <1 2 Water VC Method >5 <1.0 <1.0 Glycol WC Method >0 0 0 Nitration Abs/cm ASTM D7624* >30 0 0 Sodium ppm ASTM D5185(m) >216 2 2 Sodium ppm ASTM D5185(m) >20 8 1	Silver	ppm	ASTM D5185(m)	>3	0	0	
Copper ppm ASTM D5185(m) >125 111 155 Tin ppm ASTM D5185(m) >5 <1 <1 Vanadium ppm ASTM D5185(m) >60 6 9 Silicon ppm ASTM D5185(m) >60 6 9 Potassium ppm ASTM D5185(m) >20 <1 2 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0.2 NEG NEG Soot % % ASTM D7624* >20 8.4 9.5 Sulfation Abs/cm ASTM D7624* >20 8.4 9.5 Sulfation Abs/rm ASTM D5185(m) >20 14.1.4 Sodium ppm ASTM D5185(m) >216 2 2 Sodium ppm ASTM D5185(m) 100 3 18<	Aluminum	ppm	ASTM D5185(m)	>15	1	2	
Tin ppm ASTM D5185(m) >5 <1	Lead	ppm	ASTM D5185(m)	>30	3	5	
Vanadium ppm ASTM D5185(m) o 0 Silicon ppm ASTM D5185(m) >60 6 9 Potassium ppm ASTM D5185(m) >20 <1 2 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0.2 NEG NEG Glycol WC Method >0.2 NEG NEG Soot % % ASTM D7844* >3 0 0 Sulfation Abs/cm ASTM D7624* >20 8.4 9.5 Sulfation Abs/.1mm ASTM D7624* >20 8.4 9.5 Sulfation Abs/.1mm ASTM D7624* >20 8.4 9.5 Sulfation Abs/.1mm ASTM D5185(m) >21 2 Sodium ppm ASTM D5185(m) >216 8 140	Copper	ppm	ASTM D5185(m)	>125	111	155	
Silicon ppm ASTM D5185(m) >60 6 9 Potassium ppm ASTM D5185(m) >20 <1 2 Fuel WC Method >5 <1.0 <1.0 Water Image: WC Method >0.2 NEG NEG Glycol WC Method >0.2 NEG NEG Soot % % ASTM D7844* >3 0 0 Soot % % ASTM D7844* >3 0 0 Sulfation Abs/:nm ASTM D7644* >20 8.4 9.5 Sulfation Abs/:nm ASTM D7141* >30 21.0 41.4 Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) >216 2 2 Barium ppm ASTM D5185(m) 100 57 <t< th=""><th>Tin</th><th>ppm</th><th>ASTM D5185(m)</th><th>>5</th><th><1</th><th><1</th><th></th></t<>	Tin	ppm	ASTM D5185(m)	>5	<1	<1	
Potassium ppm ASTM D5185(m) >20 <1	Vanadium	ppm	ASTM D5185(m)		0	0	
Potassium ppm ASTM D5185(m) >20 <1	Silicon	nnm	ASTM D5185(m)	>60	6	9	
FuelWC Method>5<1.0							
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Glycol WC Method NEG NEG $$ Soot % % ASTM D7844* >3 0 0 Nitration Abs/cm ASTM D7624* >20 8.4 9.5 Sulfation Abs/cm ASTM D7624* >20 8.4 9.5 Sulfation Abs/cm ASTM D7624* >30 21.0 41.4 Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) >216 2 2 Boron ppm ASTM D5185(m) 250 8 140 Barium ppm ASTM D5185(m) 10 3 18 Malybdenum ppm ASTM D5185(m) 100 577 32 Magnesium ppm ASTM D5185(m) 450 965 636 Phosphorus ppm ASTM D5185(m) <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>							
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Emulsified WaterscalarVisual*>0.2NEGNEGSodiumppmASTM D5185(m)>21622BoronppmASTM D5185(m)2508140BariumppmASTM D5185(m)10318MolybdenumppmASTM D5185(m)10057732ManganeseppmASTM D5185(m)10057732MagnesiumppmASTM D5185(m)4509656366CalciumppmASTM D5185(m)30001110926PhosphorusppmASTM D5185(m)1150598ZincppmASTM D5185(m)13501155598SulfurppmASTM D5185(m)425022337054OxidationAbs/.1mASTM D7414'>2519.645.0							
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Boron ppm ASTM D5185(m) 250 8 140 Barium ppm ASTM D5185(m) 10 3 18 Molybdenum ppm ASTM D5185(m) 100 57 32 Manganese ppm ASTM D5185(m) 450 965 636 Magnesium ppm ASTM D5185(m) 450 965 636 Calcium ppm ASTM D5185(m) 3000 1110 926 Phosphorus ppm ASTM D5185(m) 1150 940 830 Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0							
Barium ppm ASTM D5185(m) 10 3 18 Molybdenum ppm ASTM D5185(m) 100 57 32 Manganese ppm ASTM D5185(m) 100 57 32 Magnesium ppm ASTM D5185(m) 450 965 636 Calcium ppm ASTM D5185(m) 3000 1110 926 Phosphorus ppm ASTM D5185(m) 1150 940 830 Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Sodium	ppm	()		2	2	
Molybdenum ppm ASTM D5185(m) 100 57 32 Manganese ppm ASTM D5185(m) 100 57 32 Magnesium ppm ASTM D5185(m) <1 <1 Magnesium ppm ASTM D5185(m) 450 965 636 Calcium ppm ASTM D5185(m) 3000 1110 926 Phosphorus ppm ASTM D5185(m) 1150 940 830 Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Boron	ppm	ASTM D5185(m)	250	8	140	
Manganese ppm ASTM D5185(m) <1	Barium	ppm	ASTM D5185(m)	10	3	18	
Magnesium ppm ASTM D5185(m) 450 965 636 Calcium ppm ASTM D5185(m) 3000 1110 926 Phosphorus ppm ASTM D5185(m) 1150 940 830 Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Molybdenum	ppm	ASTM D5185(m)	100	57	32	
Calcium ppm ASTM D5185(m) 3000 1110 926 Phosphorus ppm ASTM D5185(m) 1150 940 830 Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Manganese	ppm	ASTM D5185(m)		<1	<1	
Phosphorus ppm ASTM D5185(m) 1150 940 830 Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Magnesium	ppm	ASTM D5185(m)	450	965	636	
Zinc ppm ASTM D5185(m) 1350 1155 598 Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Calcium	ppm	ASTM D5185(m)	3000	1110	926	
Sulfur ppm ASTM D5185(m) 4250 2233 7054 Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Phosphorus	ppm	ASTM D5185(m)	1150	940	830	
Oxidation Abs/.1mm ASTM D7414* >25 19.6 45.0	Zinc	ppm	ASTM D5185(m)	1350	1155	598	
	Sulfur	ppm	ASTM D5185(m)	4250	2233	7054	
Visc @ 100°C cSt ASTM D7279(m) 14.4 13.1 12.4	Oxidation	Abs/.1mm	ASTM D7414*	>25	19.6	45.0	
	Visc @ 100°C	cSt	ASTM D7279(m)	14.4	13.1	12.4	







GERDAU AMERISTEEL

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Submitted By: ? Page 2 of 2