

LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Diesel Engine

Sample No: LH0267142

Oil Type: DIESEL ENGINE OIL SAE 15W40



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Sample Information

Sample Number	LH0267142	LHMC126132	LHMC88793	LHMC88803
Sample Date	18 Apr 2024	06 Sep 2018	20 Sep 2017	22 Aug 2017
Machine Hours	55376	17429	13216	12901
Oil Hours	0	0	315	300
Oil Changed	Not Chngd	Changed	Changed	Changed
Sample Status	NORMAL	NORMAL	NORMAL	NORMAL



Oil Condition

Visc @ 100°C	cSt	12.2	12.86	13.11	13.05
Base Number (BN)	mg KOH/g	10.3	---	---	---
Oxidation (PA)	%	69	79	68	64



Contamination

Water	%	NEG	NEG	NEG	NEG
Soot %	%	0.6	0.4	0.6	0.5
Nitration (PA)	%	45	52	58	50
Sulfation (PA)	%	60	60	61	53
Glycol	%	NEG	NEG	NEG	NEG
Fuel	%	0.2	<1.0	<1.0	<1.0
Silicon	ppm	9	2	4	3
Sodium	ppm	1	4	4	2
Potassium	ppm	0	<1	2	1



Wear Metals

Iron	ppm	4	7	7	5
Copper	ppm	0	<1	2	<1
Lead	ppm	0	<1	<1	<1
Tin	ppm	0	<1	6	<1
Aluminum	ppm	<1	1	<1	<1
Chromium	ppm	0	<1	<1	<1
Molybdenum	ppm	37	39	43	36
Nickel	ppm	0	0	0	<1
Titanium	ppm	0	0	0	0
Silver	ppm	0	0	0	0
Manganese	ppm	0	<1	<1	<1
Vanadium	ppm	0	0	0	0



Additives

Calcium	ppm	2094	1645	1824	1559
Magnesium	ppm	466	470	507	427
Zinc	ppm	1052	815	881	779
Phosphorus	ppm	884	700	697	690
Barium	ppm	0	0	0	0
Boron	ppm	61	39	38	36

Diagnosis

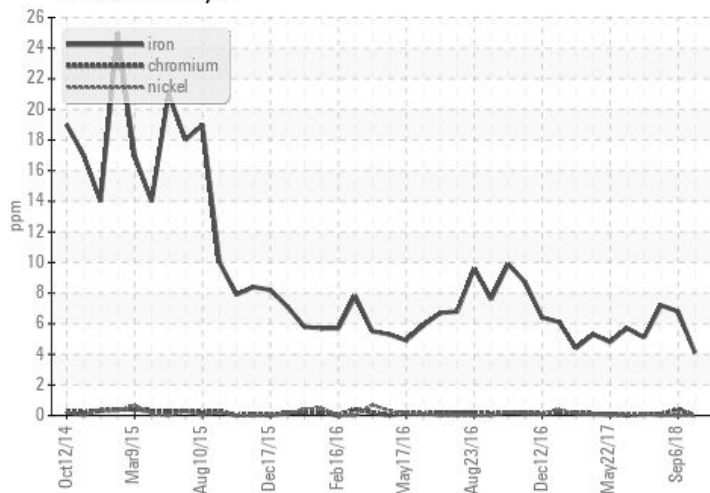
No corrective action is recommended at this time. Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample. All component wear rates are normal. Fuel content negligible. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Depot: DOMWAU
 Unique No: 10995167
 Signed: Wes Davis
 Report Date: 29 Apr 2024

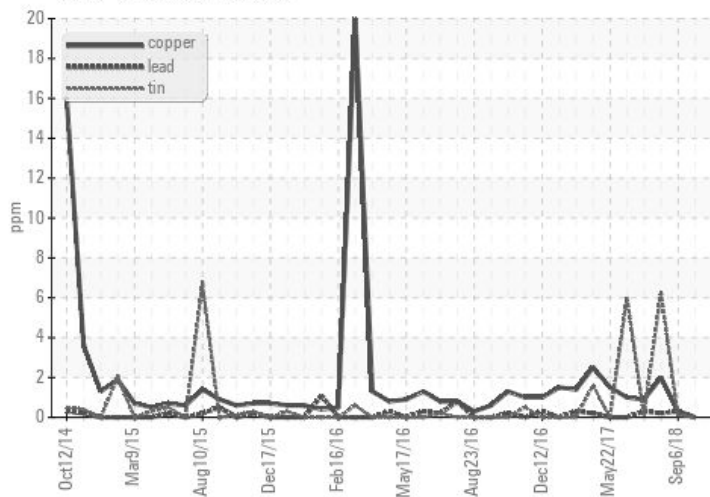


Graphs

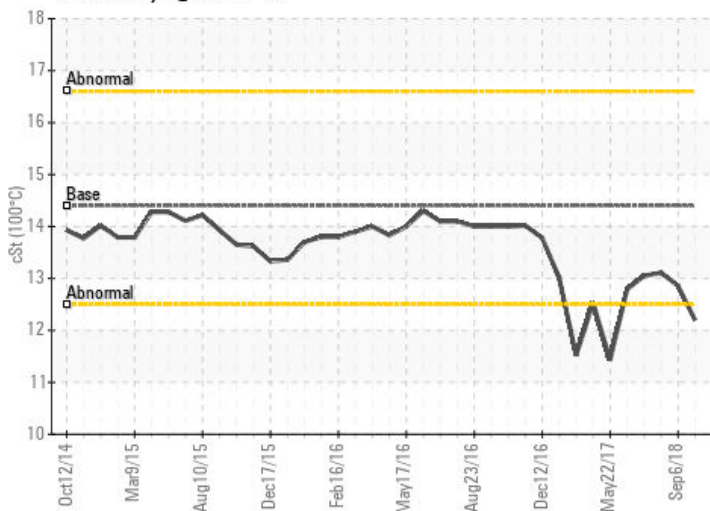
Ferrous Alloys



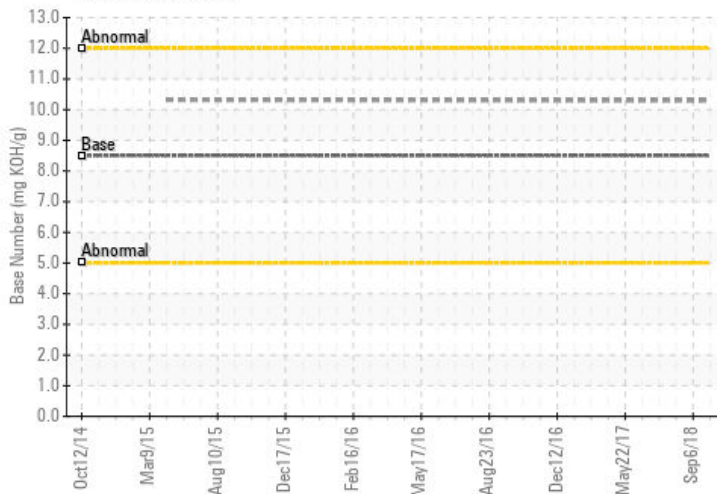
Non-ferrous Metals



Viscosity @ 100°C



Base Number



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Transmission (Manual)

Sample No: LH0267140
 Oil Type: DIESEL ENGINE OIL SAE 15W40



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Sample Information

Sample Number	LH0267140	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	ABNORMAL	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 42.7	---	---	---
-------------	-----	--------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	● 12	---	---	---
Sodium	ppm	● 30	---	---	---
Potassium	ppm	● 4	---	---	---



Wear Metals

Iron	ppm	● 209	---	---	---
Copper	ppm	● 175	---	---	---
Lead	ppm	● 9	---	---	---
Tin	ppm	● 5	---	---	---
Aluminum	ppm	● 6	---	---	---
Chromium	ppm	● 2	---	---	---
Molybdenum	ppm	● 2	---	---	---
Nickel	ppm	● 2	---	---	---
Titanium	ppm	● <1	---	---	---
Silver	ppm	● <1	---	---	---
Manganese	ppm	● 38	---	---	---
Vanadium	ppm	● <1	---	---	---



Additives

Calcium	ppm	● 2226	---	---	---
Magnesium	ppm	● 171	---	---	---
Zinc	ppm	● 1401	---	---	---
Phosphorus	ppm	● 1322	---	---	---
Barium	ppm	● 5	---	---	---
Boron	ppm	● 11	---	---	---

Diagnosis

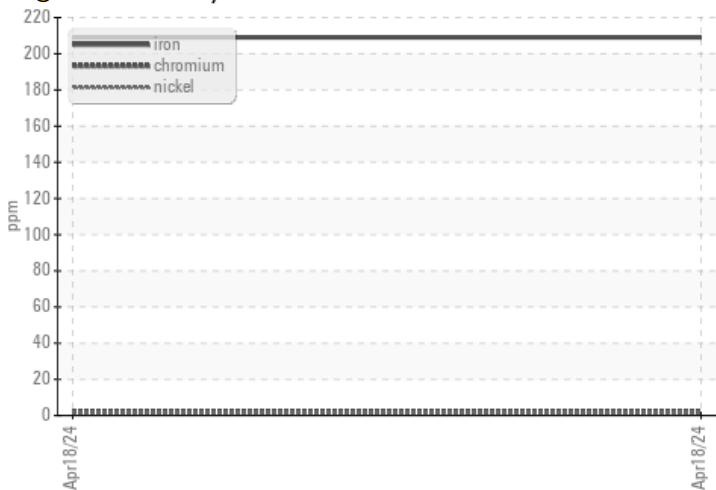
No corrective action is recommended at this time. Resample at the next service interval to monitor. The iron level is abnormal. All other component wear rates are normal. There is no indication of any contamination in the fluid. The condition of the fluid is acceptable for the time in service.

Depot: DOMWAU
 Unique No: 10995370
 Signed: Don Baldrige
 Report Date: 26 Apr 2024

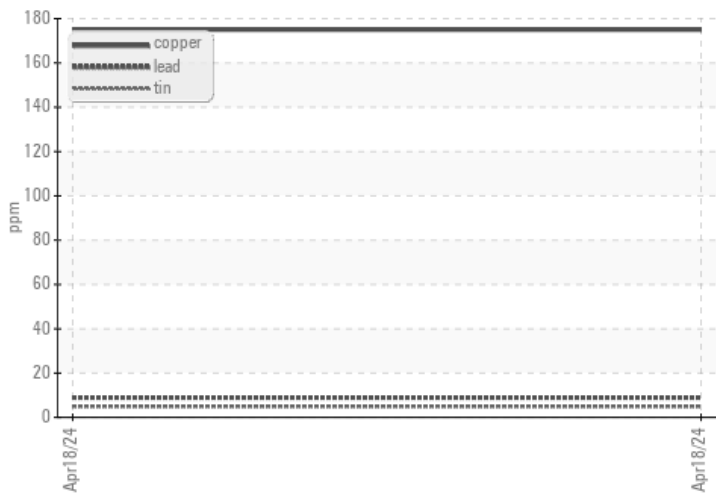


Graphs

● Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C



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CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Hydraulic System

Sample No: LH0267145

Oil Type: TDH FLUID SAE 75W80



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Sample Information

Sample Number	LH0267145	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	NORMAL	---	---	---



Oil Condition

Visc @ 40°C	cSt	47.1	---	---	---
Acid Number (AN)	mg KOH/g	1.32	---	---	---



Contamination

Water	%	NEG	---	---	---
Particles >4µm		15709	---	---	---
Particles >6µm		1022	---	---	---
Particles >14µm		140	---	---	---
ISO 4406:1999 (c)		21/17/14	---	---	---
Silicon	ppm	13	---	---	---
Sodium	ppm	0	---	---	---
Potassium	ppm	2	---	---	---



Wear Metals

Iron	ppm	3	---	---	---
Copper	ppm	2	---	---	---
Lead	ppm	1	---	---	---
Tin	ppm	1	---	---	---
Aluminum	ppm	2	---	---	---
Chromium	ppm	<1	---	---	---
Molybdenum	ppm	4	---	---	---
Nickel	ppm	1	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	<1	---	---	---
Manganese	ppm	1	---	---	---
Vanadium	ppm	<1	---	---	---



Additives

Calcium	ppm	3305	---	---	---
Magnesium	ppm	26	---	---	---
Zinc	ppm	1362	---	---	---
Phosphorus	ppm	1153	---	---	---
Barium	ppm	<1	---	---	---
Boron	ppm	88	---	---	---

Diagnosis

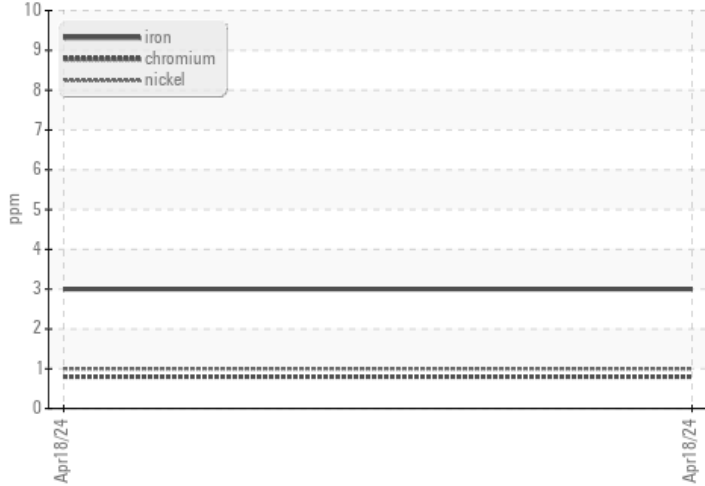
Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Depot: DOMWAU
Unique No: 10995195
Signed: Don Baldrige
Report Date: 26 Apr 2024

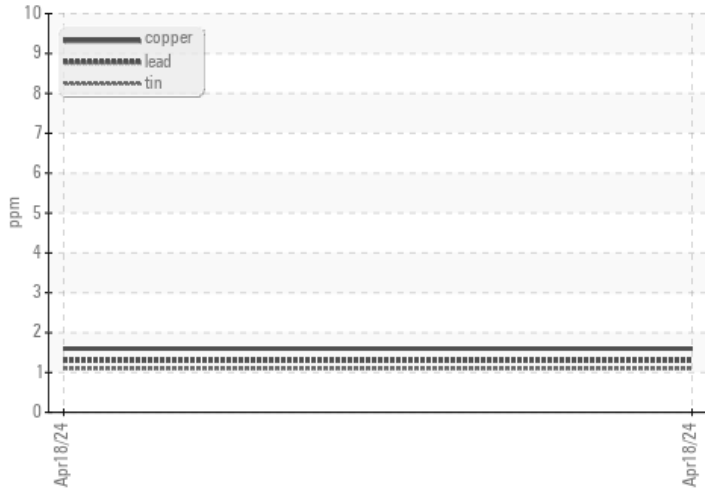


Graphs

Ferrous Alloys



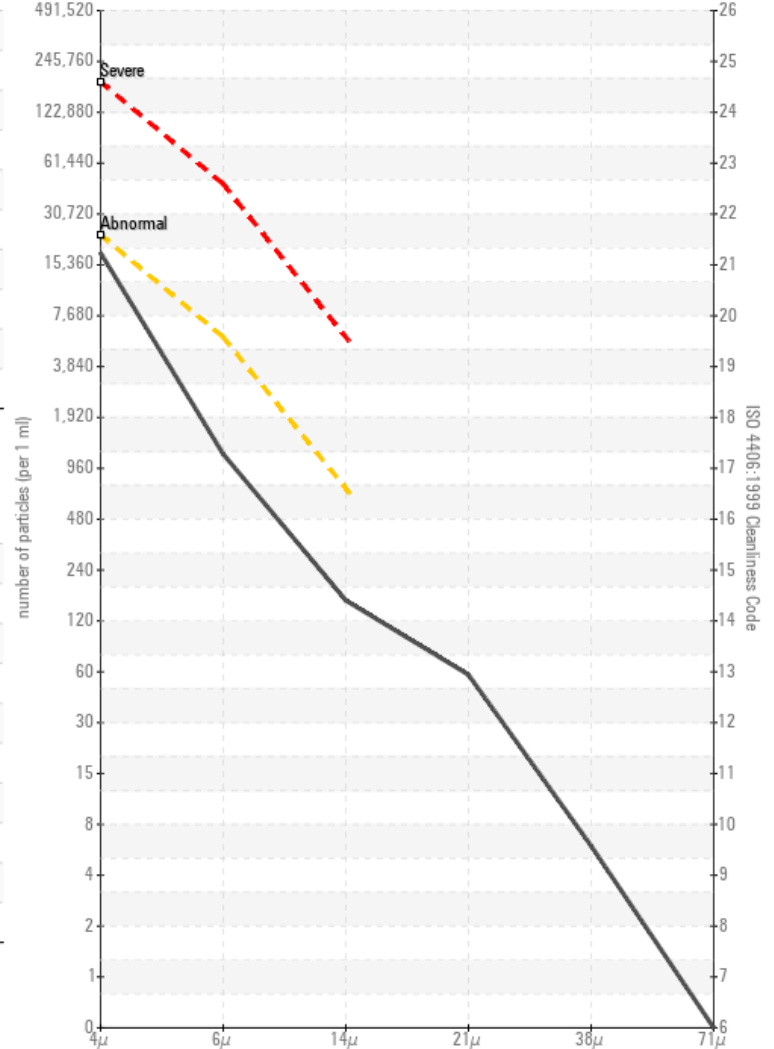
Non-ferrous Metals



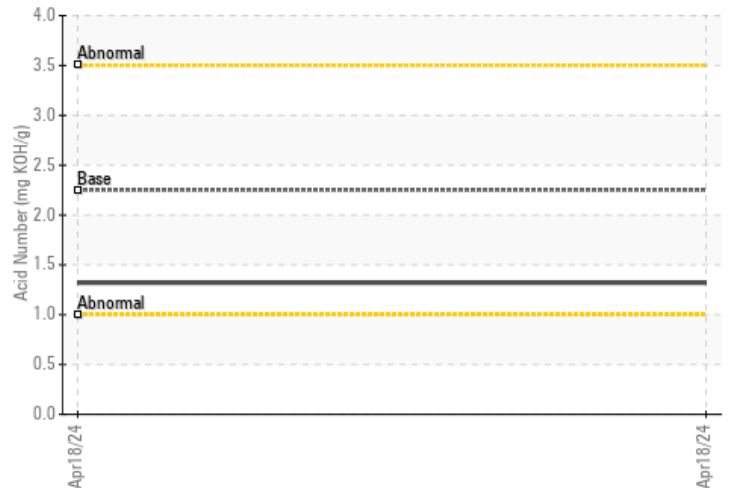
Viscosity @ 40°C



Particle Count



Acid Number



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Swing Drive

Sample No: LH0267143

Oil Type: GEAR OIL SAE 80W90



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Sample Information

Sample Number	LH0267143	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	SEVERE	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 218	---	---	---
-------------	-----	-------	-----	-----	-----



Contamination

Water	%	● 0.268	---	---	---
Silicon	ppm	● 18	---	---	---
Sodium	ppm	● 2	---	---	---
Potassium	ppm	● 2	---	---	---



Wear Metals

Iron	ppm	● 902	---	---	---
Copper	ppm	● 1210	---	---	---
Lead	ppm	● 0	---	---	---
Tin	ppm	● 62	---	---	---
Aluminum	ppm	● 2	---	---	---
Chromium	ppm	● 6	---	---	---
Molybdenum	ppm	● 0	---	---	---
Nickel	ppm	● 3	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	0	---	---	---
Manganese	ppm	● 7	---	---	---
Vanadium	ppm	0	---	---	---



Additives

Calcium	ppm	● 68	---	---	---
Magnesium	ppm	● 0	---	---	---
Zinc	ppm	● 52	---	---	---
Phosphorus	ppm	● 226	---	---	---
Barium	ppm	● 0	---	---	---
Boron	ppm	● 32	---	---	---

Diagnosis

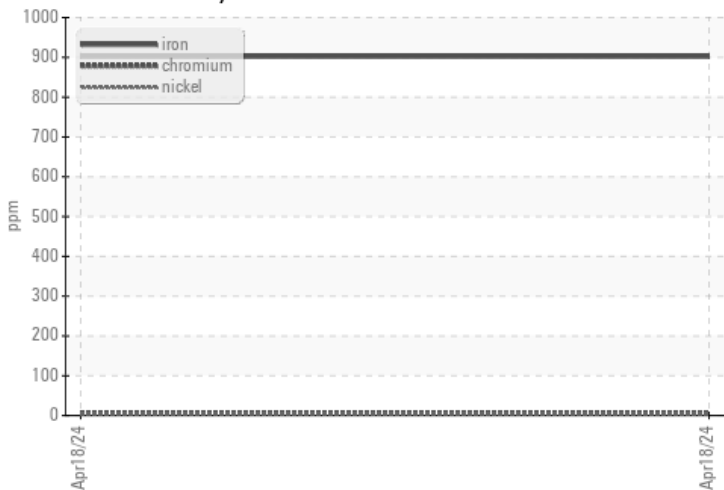
We recommend that you drain the oil from the component if this has not already been done. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition. Bearing and/or bushing wear is indicated. There is a light concentration of water present in the oil. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

Depot: DOMWAU
 Unique No: 11004470
 Signed: Don Baldrige
 Report Date: 01 May 2024

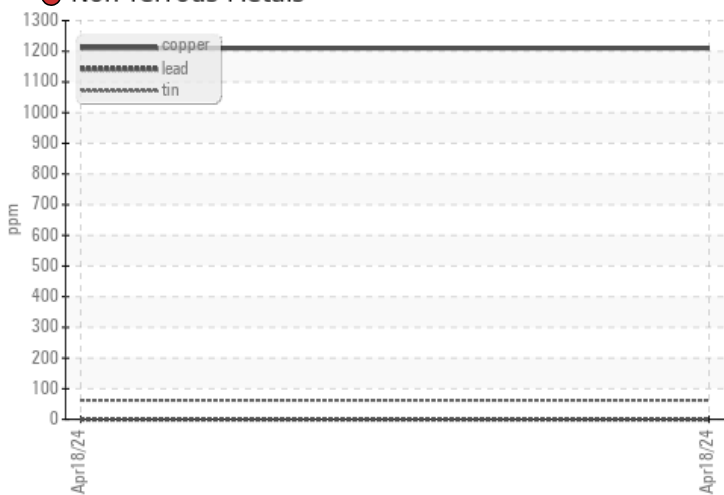


Graphs

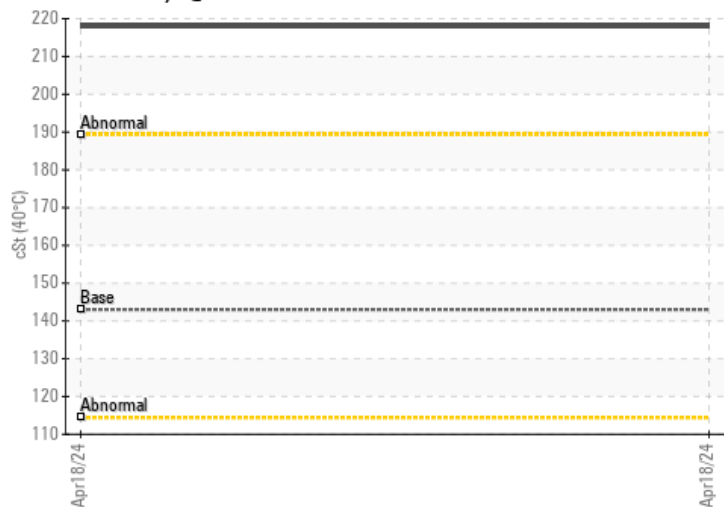
Ferrous Alloys



● Non-ferrous Metals



Viscosity @ 40°C



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Front Left Wheel Hub

Sample No: LH0267141

Oil Type: GEAR OIL SAE 80W90



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Sample Information

Sample Number	LH0267141	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	SEVERE	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 89.6	---	---	---
-------------	-----	--------	-----	-----	-----



Contamination

Water	%	● 0.166	---	---	---
Silicon	ppm	● 31	---	---	---
Sodium	ppm	● 8	---	---	---
Potassium	ppm	● 10	---	---	---



Wear Metals

Iron	ppm	● 1592	---	---	---
Copper	ppm	● 56	---	---	---
Lead	ppm	● 2	---	---	---
Tin	ppm	● <1	---	---	---
Aluminum	ppm	● 5	---	---	---
Chromium	ppm	● 10	---	---	---
Molybdenum	ppm	● 3	---	---	---
Nickel	ppm	● 3	---	---	---
Titanium	ppm	1	---	---	---
Silver	ppm	<1	---	---	---
Manganese	ppm	● 17	---	---	---
Vanadium	ppm	<1	---	---	---



Additives

Calcium	ppm	● 696	---	---	---
Magnesium	ppm	● 8	---	---	---
Zinc	ppm	● 321	---	---	---
Phosphorus	ppm	● 1311	---	---	---
Barium	ppm	● 2	---	---	---
Boron	ppm	● 15	---	---	---

Diagnosis

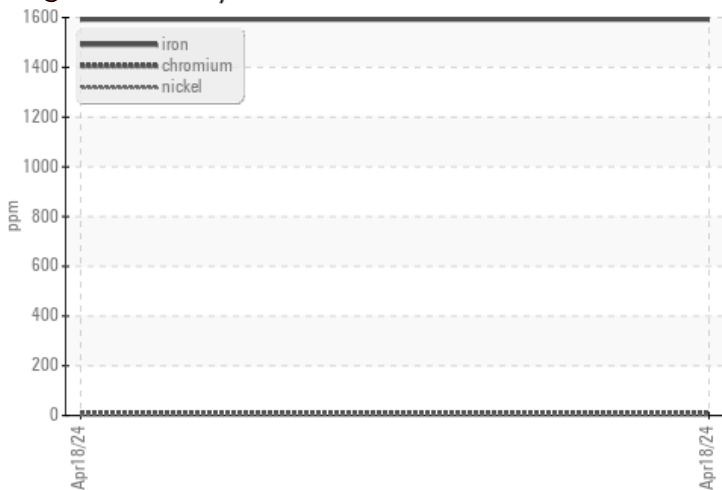
We recommend that you drain the oil from the component if this has not already been done. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition. Gear wear is indicated. The water content is negligible. There is no indication of any contamination in the oil. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

Depot: DOMWAU
Unique No: 10995343
Signed: Sean Felton
Report Date: 26 Apr 2024

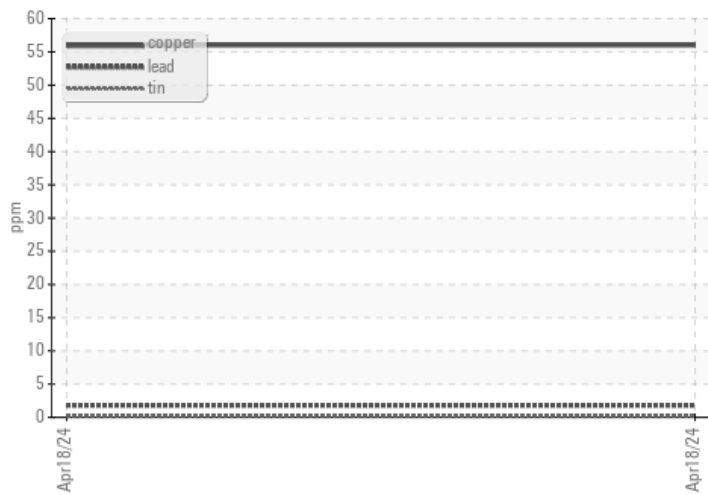


Graphs

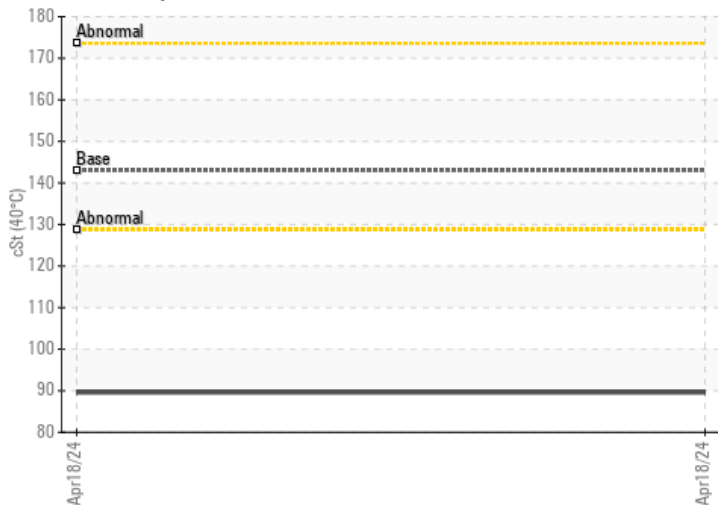
● Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Front Differential

Sample No: LH0267147

Oil Type: GEAR OIL SAE 80W90



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Sample Information

Sample Number	LH0267147	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	ABNORMAL	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 184	---	---	---
-------------	-----	-------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	● 8	---	---	---
Sodium	ppm	● 0	---	---	---
Potassium	ppm	● 2	---	---	---



Wear Metals

Iron	ppm	● 109	---	---	---
Copper	ppm	● 207	---	---	---
Lead	ppm	● 2	---	---	---
Tin	ppm	● 1	---	---	---
Aluminum	ppm	● 2	---	---	---
Chromium	ppm	● 2	---	---	---
Molybdenum	ppm	● 1	---	---	---
Nickel	ppm	● 2	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	<1	---	---	---
Manganese	ppm	● 4	---	---	---
Vanadium	ppm	<1	---	---	---



Additives

Calcium	ppm	● 9	---	---	---
Magnesium	ppm	● 1	---	---	---
Zinc	ppm	● 145	---	---	---
Phosphorus	ppm	● 1153	---	---	---
Barium	ppm	● 242	---	---	---
Boron	ppm	● <1	---	---	---

Diagnosis

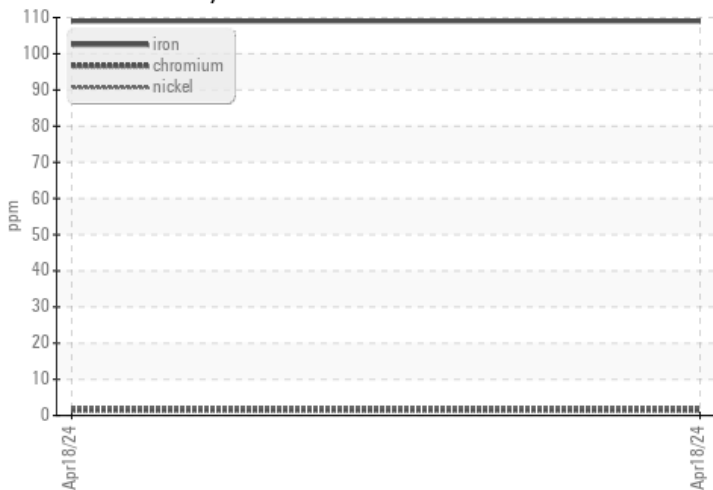
No corrective action is recommended at this time. Resample at the next service interval to monitor. The copper level is abnormal. All other component wear rates are normal. There is no indication of any contamination in the oil. The condition of the oil is acceptable for the time in service.

Depot: DOMWAU
Unique No: 10995347
Signed: Sean Felton
Report Date: 26 Apr 2024

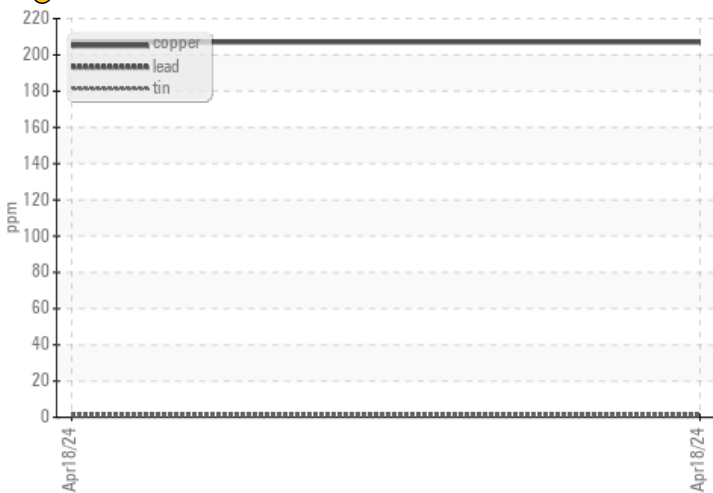


Graphs

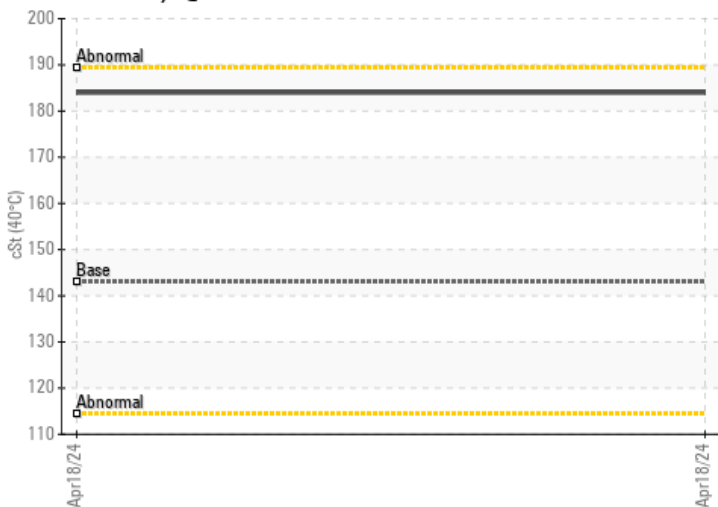
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Splitter Box

Sample No: LH0267144

Oil Type: GEAR OIL SAE 80W90



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Sample Information

Sample Number	LH0267144	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	NORMAL	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 137	---	---	---
-------------	-----	-------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	● 16	---	---	---
Sodium	ppm	● <1	---	---	---
Potassium	ppm	● 4	---	---	---



Wear Metals

Iron	ppm	● 76	---	---	---
Copper	ppm	● 8	---	---	---
Lead	ppm	● 2	---	---	---
Tin	ppm	● 1	---	---	---
Aluminum	ppm	● 3	---	---	---
Chromium	ppm	● 2	---	---	---
Molybdenum	ppm	● 2	---	---	---
Nickel	ppm	● 1	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	<1	---	---	---
Manganese	ppm	● 2	---	---	---
Vanadium	ppm	<1	---	---	---



Additives

Calcium	ppm	● 686	---	---	---
Magnesium	ppm	● 8	---	---	---
Zinc	ppm	● 386	---	---	---
Phosphorus	ppm	● 1332	---	---	---
Barium	ppm	● 2	---	---	---
Boron	ppm	● 52	---	---	---

Diagnosis

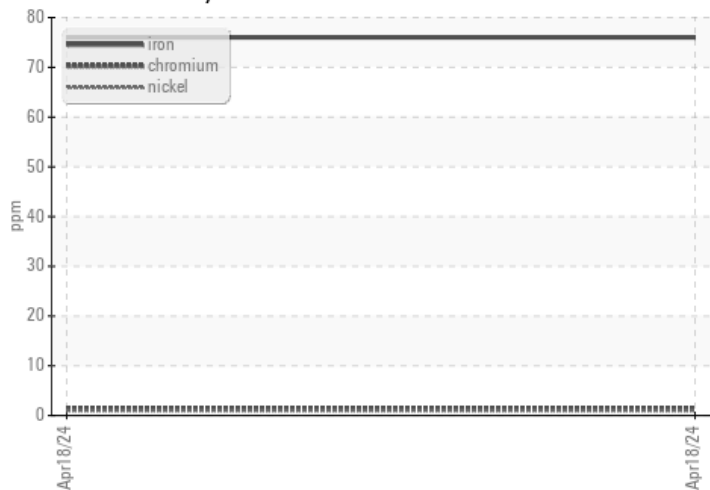
Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The condition of the oil is acceptable for the time in service.

Depot: DOMWAU
Unique No: 10995351
Signed: Sean Felton
Report Date: 26 Apr 2024

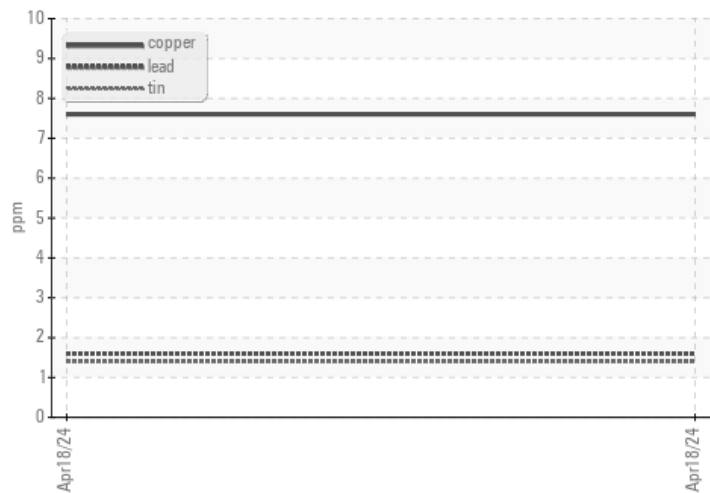


Graphs

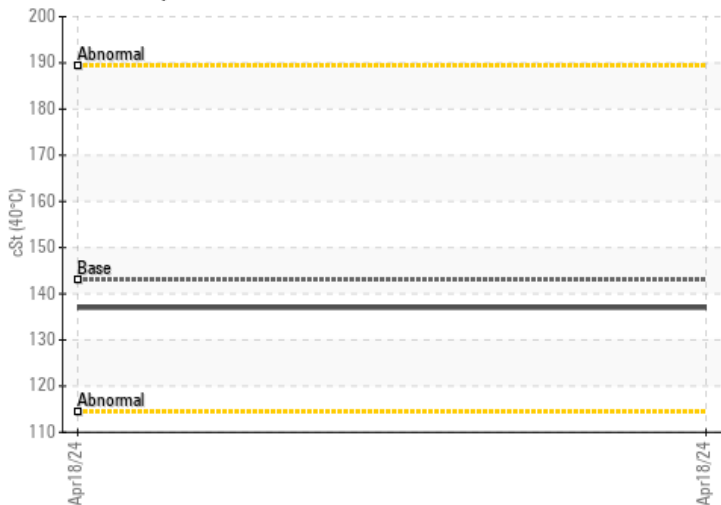
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Rear Left Wheel Hub

Sample No: LH0264725

Oil Type: GEAR OIL SAE 80W90



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Sample Information

Sample Number	LH0264725	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	ABNORMAL	---	---	---



Oil Condition

Visc @ 40°C	cSt	98.3	---	---	---
-------------	-----	------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	22	---	---	---
Sodium	ppm	10	---	---	---
Potassium	ppm	2	---	---	---



Wear Metals

Iron	ppm	419	---	---	---
Copper	ppm	135	---	---	---
Lead	ppm	2	---	---	---
Tin	ppm	0	---	---	---
Aluminum	ppm	3	---	---	---
Chromium	ppm	1	---	---	---
Molybdenum	ppm	1	---	---	---
Nickel	ppm	<1	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	0	---	---	---
Manganese	ppm	7	---	---	---
Vanadium	ppm	0	---	---	---



Additives

Calcium	ppm	1250	---	---	---
Magnesium	ppm	13	---	---	---
Zinc	ppm	555	---	---	---
Phosphorus	ppm	2055	---	---	---
Barium	ppm	2	---	---	---
Boron	ppm	33	---	---	---

Diagnosis

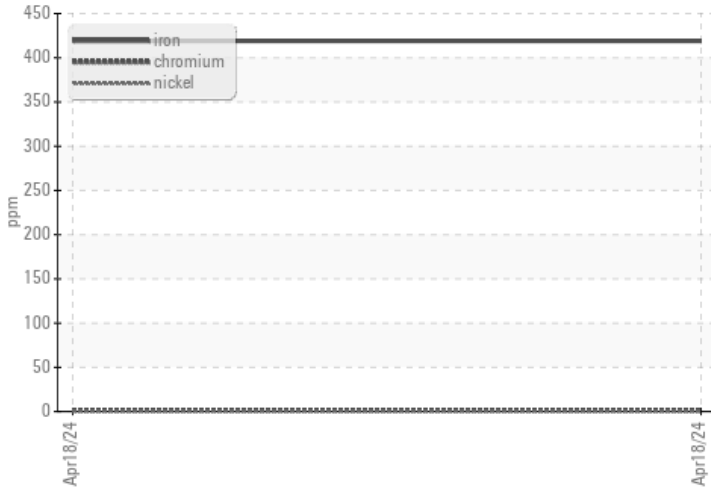
No corrective action is recommended at this time. Resample at the next service interval to monitor. Bearing and/or bushing wear is indicated. All other component wear rates are normal. There is no indication of any contamination in the oil. The oil viscosity is lower than normal. The condition of the oil is acceptable for the time in service.

Depot: DOMWAU
Unique No: 10996465
Signed: Don Baldrige
Report Date: 29 Apr 2024

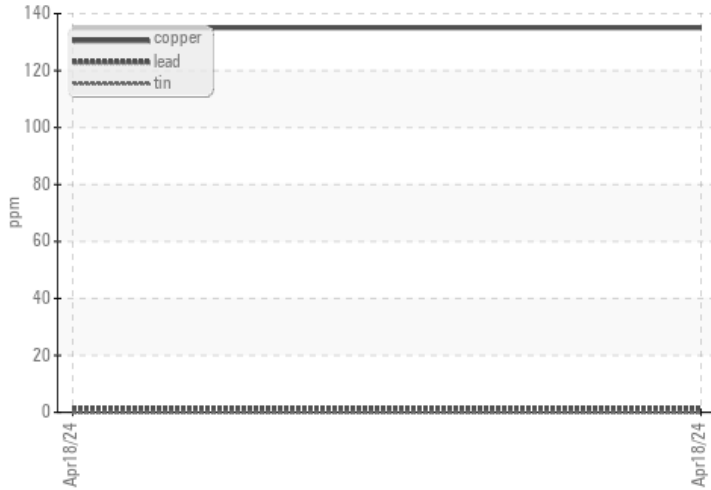


Graphs

Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Rear Differential

Sample No: LH0267146

Oil Type: GEAR OIL SAE 80W90



DOMTAR PULP AND PAPER

301 POINT BASSE AVE

NEKOOSA, WI

US 54457

Contact: MARK SNYDER

mark.snyder@domtar.com

T: (715)675-6900

F: (715)675-9748



Sample Information

Sample Number	LH0267146	---	---	---
Sample Date	18 Apr 2024	---	---	---
Machine Hours	55376	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	SEVERE	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 99.5	---	---	---
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Contamination

Water	%	NEG	---	---	---
Silicon	ppm	● 20	---	---	---
Sodium	ppm	● 10	---	---	---
Potassium	ppm	● 1	---	---	---



Wear Metals

Iron	ppm	● 361	---	---	---
Copper	ppm	● 141	---	---	---
Lead	ppm	● <1	---	---	---
Tin	ppm	● <1	---	---	---
Aluminum	ppm	● 3	---	---	---
Chromium	ppm	● 1	---	---	---
Molybdenum	ppm	● 0	---	---	---
Nickel	ppm	● <1	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	0	---	---	---
Manganese	ppm	● 6	---	---	---
Vanadium	ppm	0	---	---	---



Additives

Calcium	ppm	● 1117	---	---	---
Magnesium	ppm	● 10	---	---	---
Zinc	ppm	● 484	---	---	---
Phosphorus	ppm	● 1903	---	---	---
Barium	ppm	● 0	---	---	---
Boron	ppm	● 33	---	---	---

Diagnosis

No corrective action is recommended at this time. We recommend an early resample to monitor this condition. Bearing and/or gear wear is indicated. There is no indication of any contamination in the oil. The condition of the oil is acceptable for the time in service.

Depot: DOMWAU

Unique No: 11004495

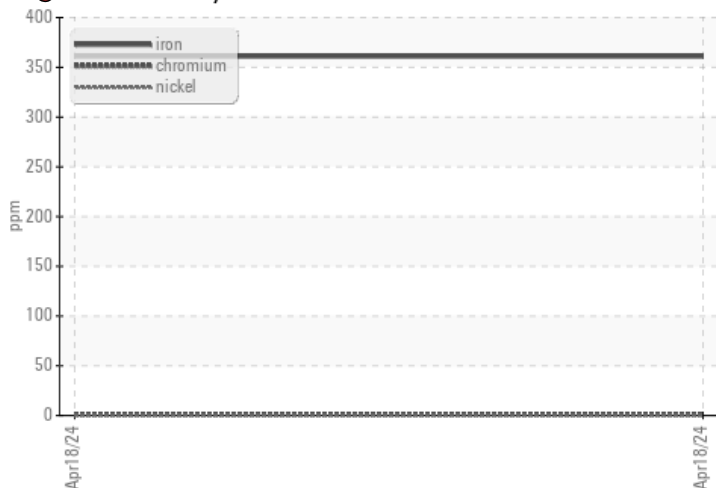
Signed: Don Baldrige

Report Date: 01 May 2024

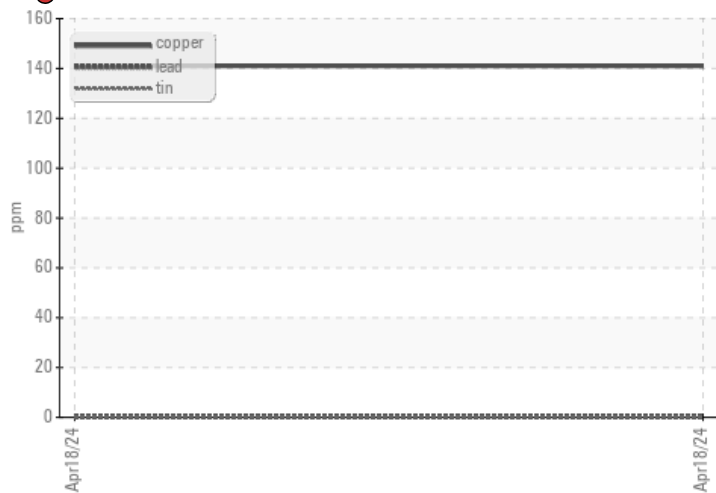


Graphs

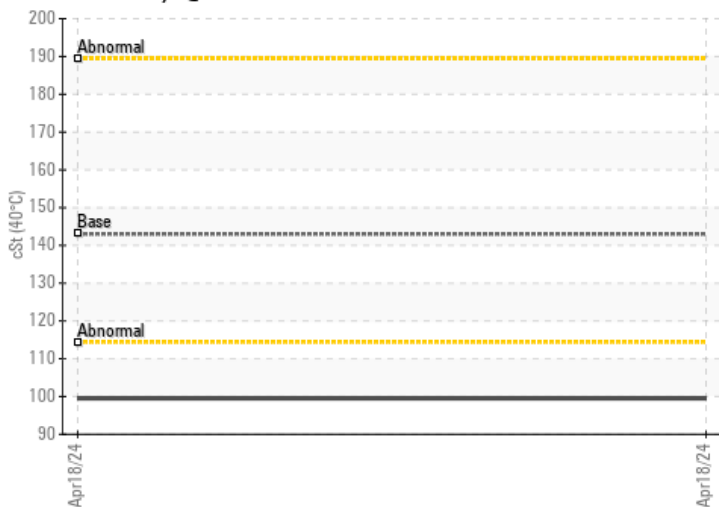
● Ferrous Alloys



● Non-ferrous Metals



Viscosity @ 40°C



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A934C 065595-1007 - Rear Right Wheel Hub

Sample No: LH0267148

Oil Type: GEAR OIL SAE 80W90



DOMTAR PULP AND PAPER

301 POINT BASSE AVE
NEKOOSA, WI
US 54457

Contact: MARK SNYDER
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F: (715)675-9748



Sample Information

Sample Number	LH0267148	LH0267149	---	---
Sample Date	18 Apr 2024	18 Apr 2024	---	---
Machine Hours	55376	55376	---	---
Oil Hours	0	0	---	---
Oil Changed	Not Changd	Not Changd	---	---
Sample Status	SEVERE	ABNORMAL	---	---



Oil Condition

Visc @ 40°C	cSt	71.6	97.4	---	---
-------------	-----	------	------	-----	-----



Contamination

Water	%	NEG	NEG	---	---
Silicon	ppm	31	22	---	---
Sodium	ppm	11	10	---	---
Potassium	ppm	5	2	---	---



Wear Metals

Iron	ppm	1273	415	---	---
Copper	ppm	46	139	---	---
Lead	ppm	0	2	---	---
Tin	ppm	<1	0	---	---
Aluminum	ppm	5	3	---	---
Chromium	ppm	6	1	---	---
Molybdenum	ppm	0	1	---	---
Nickel	ppm	0	<1	---	---
Titanium	ppm	<1	<1	---	---
Silver	ppm	0	0	---	---
Manganese	ppm	13	7	---	---
Vanadium	ppm	0	0	---	---



Additives

Calcium	ppm	1738	1275	---	---
Magnesium	ppm	14	14	---	---
Zinc	ppm	717	558	---	---
Phosphorus	ppm	1446	2086	---	---
Barium	ppm	0	2	---	---
Boron	ppm	43	33	---	---

Diagnosis

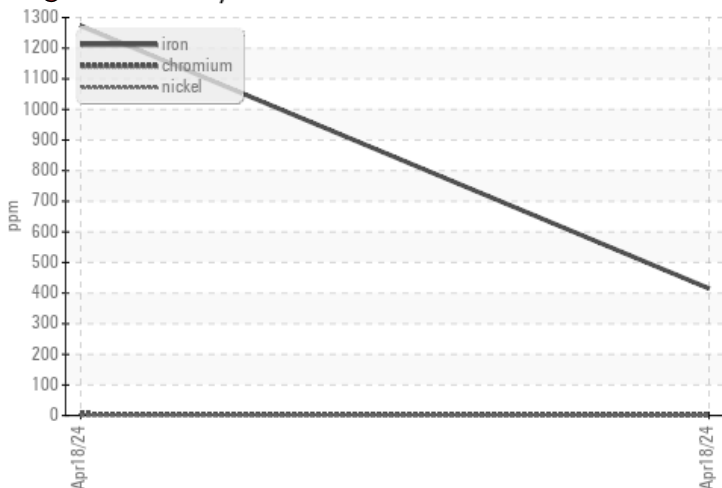
We recommend that you drain the oil from the component if this has not already been done. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition. NOTE: one of two samples received with same ID and sampling date. Gear wear is indicated. There is no indication of any contamination in the oil. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

Depot: DOMWAU
Unique No: 11004485
Signed: Don Baldrige
Report Date: 01 May 2024

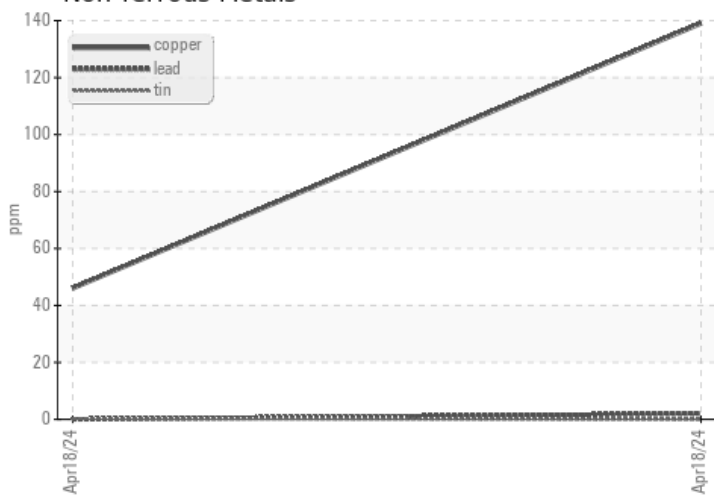


Graphs

● Ferrous Alloys



Non-ferrous Metals



● Viscosity @ 40°C

