

# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR L550 1214-46296 - Diesel Engine

Sample No: LH0236645

Oil Type: LIEBHERR MOTOROIL 5W-30 LOW ASH



#### Sample Information

Sample Number	LH0236645	LH0236293	LH0207763	LHMC104288
Sample Date	19 Apr 2023	27 Oct 2022	11 Apr 2022	07 Aug 2018
Machine Hours	2422	2289	1507	448
Oil Hours	0	0	0	448
Oil Changed	Changed	Changed	Changed	Changed
Sample Status	NORMAL	NORMAL	NORMAL	ABNORMAL

**AMERICAN STATE EQUIPMENT CO.**  
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 T: (414)234-0854  
 F: (414)541-1892



#### Oil Condition

Visc @ 100°C	cSt	13.2	11.3	11.4	11.9
Base Number (BN)	mg KOH/g	7.5	8.7	13.2	---
Oxidation (PA)	%	47	53	85	173



#### Contamination

Water	%	NEG	NEG	NEG	NEG
Soot %	%	0.1	0.1	0.1	0.1
Nitration (PA)	%	53	70	120	84
Sulfation (PA)	%	43	53	64	99
Glycol	%	NEG	NEG	NEG	NEG
Fuel	%	<1.0	<1.0	<1.0	<1.0
Silicon	ppm	7	7	8	15
Sodium	ppm	4	<1	4	4
Potassium	ppm	1	4	11	29

#### 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 BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.



#### Wear Metals

Iron	ppm	3	3	18	11
Copper	ppm	<1	2	81	418
Lead	ppm	0	0	2	2
Tin	ppm	0	0	2	1
Aluminum	ppm	<1	<1	3	5
Chromium	ppm	0	0	1	<1
Molybdenum	ppm	17	2	11	44
Nickel	ppm	0	0	<1	<1
Titanium	ppm	60	<1	1	0
Silver	ppm	0	0	<1	<1
Manganese	ppm	<1	<1	<1	2
Vanadium	ppm	<1	0	0	0



#### Additives

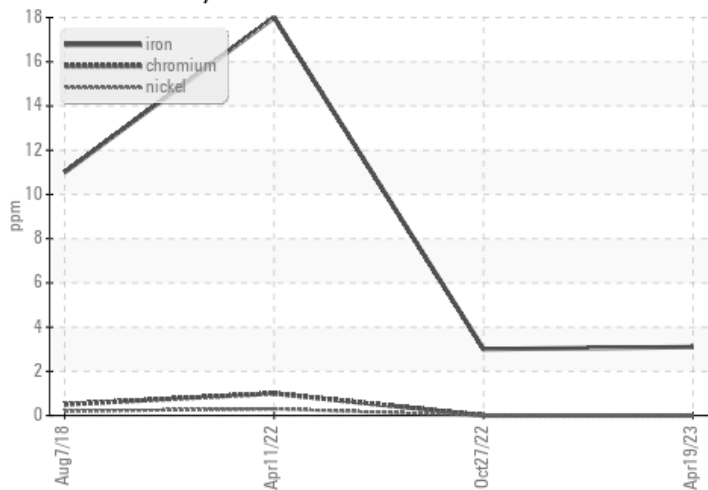
Calcium	ppm	1281	1342	4012	1585
Magnesium	ppm	712	632	205	898
Zinc	ppm	1144	815	1190	936
Phosphorus	ppm	951	700	1040	712
Barium	ppm	0	0	<1	41
Boron	ppm	120	91	206	102

**Depot:** LEC0007  
**Unique No:** 10445083  
**Signed:** Don Baldrige  
**Report Date:** 01 May 2023

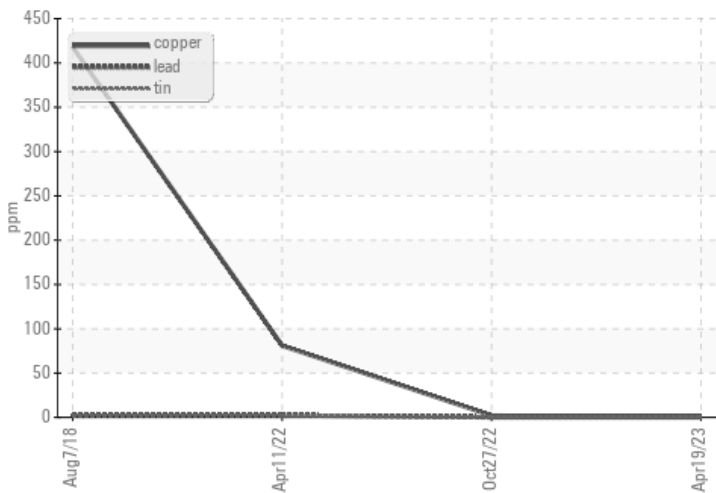


### Graphs

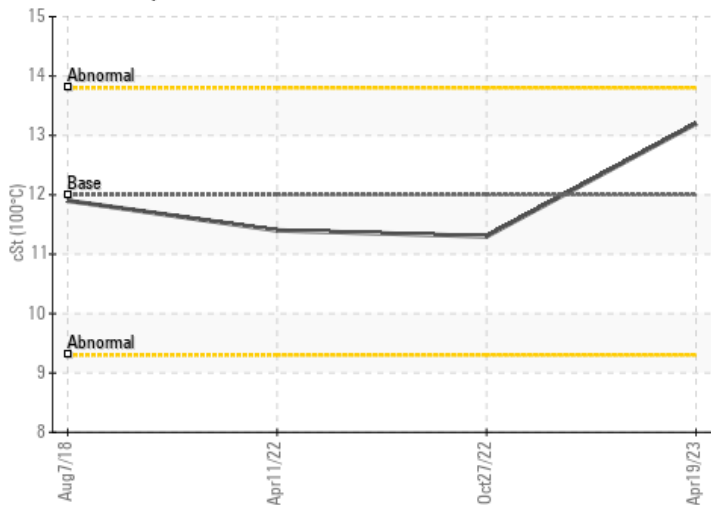
Ferrous Alloys



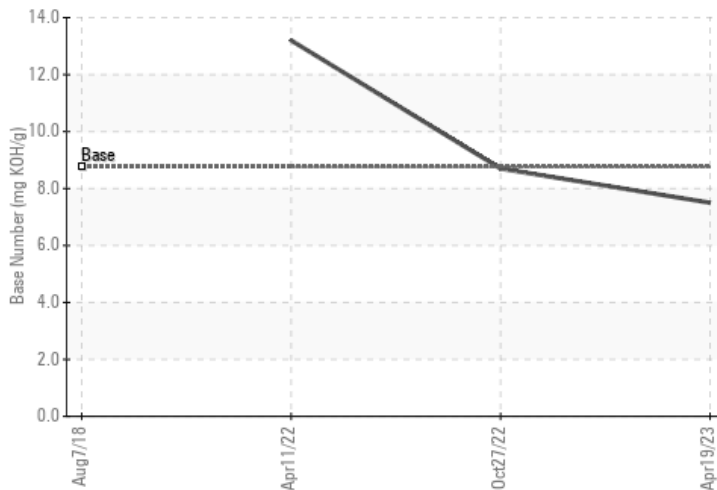
Non-ferrous Metals



Viscosity @ 100°C



Base Number



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR L550 1214-46296 - Transmission (Manual)

Sample No: LH0236646

Oil Type: LIEBHERR GEAR MF 80W



#### Sample Information

Sample Number	LH0236646	LH0236295	LH0207762	LHMC104284
Sample Date	19 Apr 2023	27 Oct 2022	11 Apr 2022	07 Aug 2018
Machine Hours	2422	2289	1507	448
Oil Hours	0	0	0	448
Oil Changed	Changed	Changed	Changed	Not Changd
Sample Status	NORMAL	NORMAL	NORMAL	NORMAL

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#### Oil Condition

Visc @ 40°C	cSt	51.2	45.8	43.7	45.00
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#### Contamination

Water	%	NEG	NEG	NEG	NEG
Silicon	ppm	5	9	7	7
Sodium	ppm	4	7	11	13
Potassium	ppm	<1	3	0	5

#### 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.



#### Wear Metals

Iron	ppm	6	10	17	9
Copper	ppm	<1	2	5	8
Lead	ppm	0	<1	<1	0
Tin	ppm	0	0	<1	0
Aluminum	ppm	1	1	<1	0
Chromium	ppm	<1	0	<1	0
Molybdenum	ppm	<1	0	<1	0
Nickel	ppm	0	0	<1	0
Titanium	ppm	0	0	<1	0
Silver	ppm	0	0	<1	0
Manganese	ppm	<1	<1	<1	<1
Vanadium	ppm	0	0	0	0



#### Additives

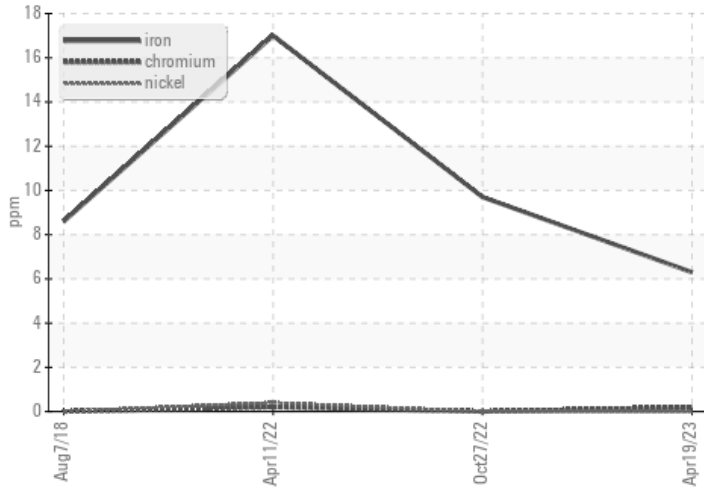
Calcium	ppm	3223	3634	3535	3763
Magnesium	ppm	8	8	8	6
Zinc	ppm	1406	1441	1391	1509
Phosphorus	ppm	1153	1149	1163	1062
Barium	ppm	0	0	0	0
Boron	ppm	37	116	113	105

Depot: LEC0007  
 Unique No: 10445758  
 Signed: Sean Felton  
 Report Date: 01 May 2023

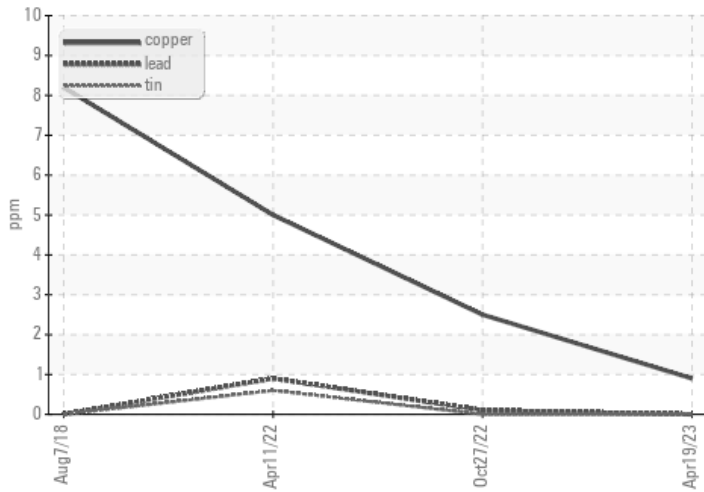


### Graphs

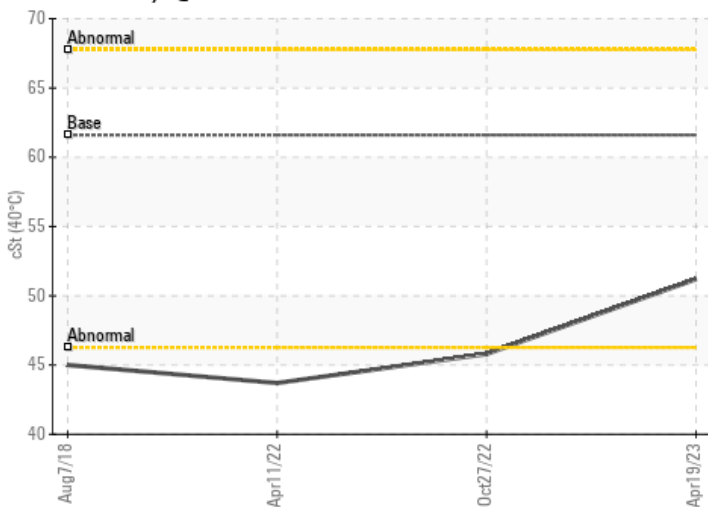
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR L550 1214-46296 - Hydraulic System

Sample No: LH0245002

Oil Type: {unknown}



#### Sample Information

Sample Number	LH0245002	LH0207761	LHMC104285	---
Sample Date	19 Apr 2023	11 Apr 2022	07 Aug 2018	---
Machine Hours	2422	1507	448	---
Oil Hours	0	0	448	---
Oil Changed	Not Changd	Not Changd	Not Changd	---
Sample Status	ABNORMAL	ABNORMAL	NORMAL	---

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#### Oil Condition

Visc @ 40°C	cSt	46.3	47.4	49.00	---
Acid Number (AN)	mg KOH/g	1.00	1.17	1.374	---



#### Contamination

Water	%	NEG	NEG	NEG	---
Particles >4µm		64343	49482	10624	---
Particles >6µm		7182	3008	678	---
Particles >14µm		27	45	33	---
ISO 4406:1999 (c)		23/20/12	23/19/13	21/17/12	---
Silicon	ppm	3	2	2	---
Sodium	ppm	0	3	1	---
Potassium	ppm	2	0	1	---

#### Diagnosis

No corrective action is recommended at this time. The filter change at the time of sampling has been noted. Resample at the next service interval to monitor. The lead level is abnormal. All other component wear rates are normal. There is a high amount of silt (particulates < 6 microns in size) present in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.



#### Wear Metals

Iron	ppm	11	8	4	---
Copper	ppm	6	5	2	---
Lead	ppm	13	11	6	---
Tin	ppm	<1	<1	0	---
Aluminum	ppm	0	1	<1	---
Chromium	ppm	2	1	<1	---
Molybdenum	ppm	<1	<1	0	---
Nickel	ppm	0	0	<1	---
Titanium	ppm	0	0	0	---
Silver	ppm	0	1	0	---
Manganese	ppm	<1	<1	<1	---
Vanadium	ppm	0	0	0	---



#### Additives

Calcium	ppm	1133	1198	1371	---
Magnesium	ppm	9	8	6	---
Zinc	ppm	652	622	699	---
Phosphorus	ppm	526	576	606	---
Barium	ppm	0	0	0	---
Boron	ppm	0	2	<1	---

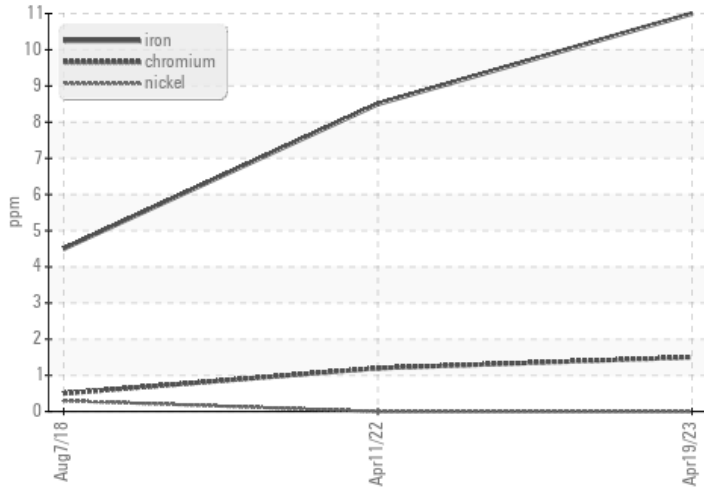
Depot: LEC0007  
 Unique No: 10445442  
 Signed: Don Baldrige  
 Report Date: 01 May 2023



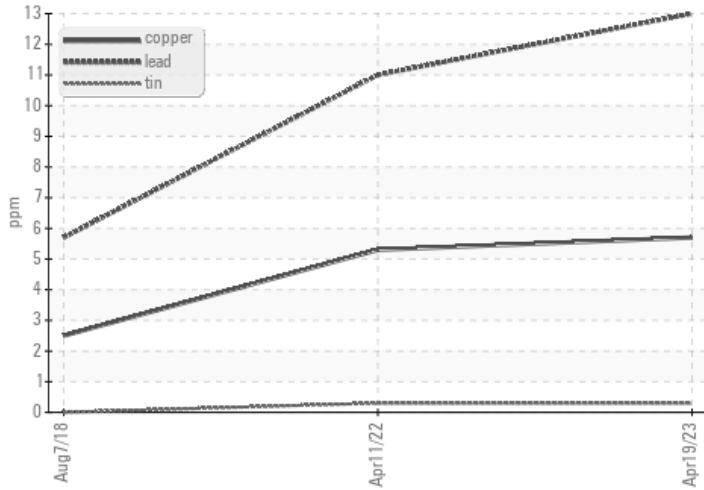


### Graphs

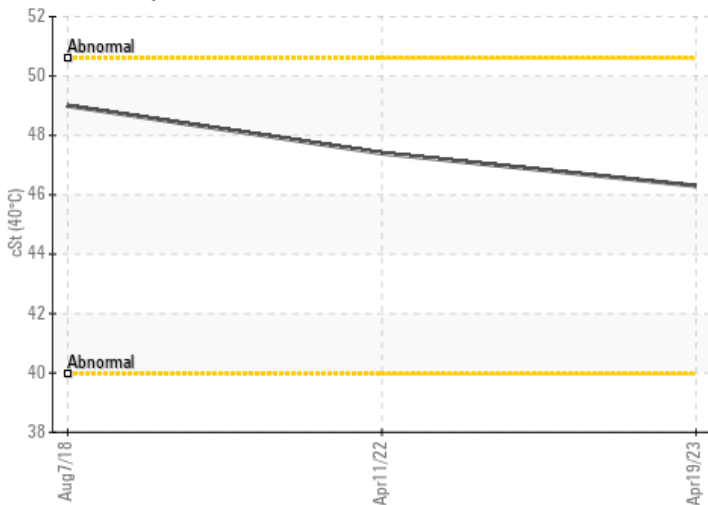
#### Ferrous Alloys



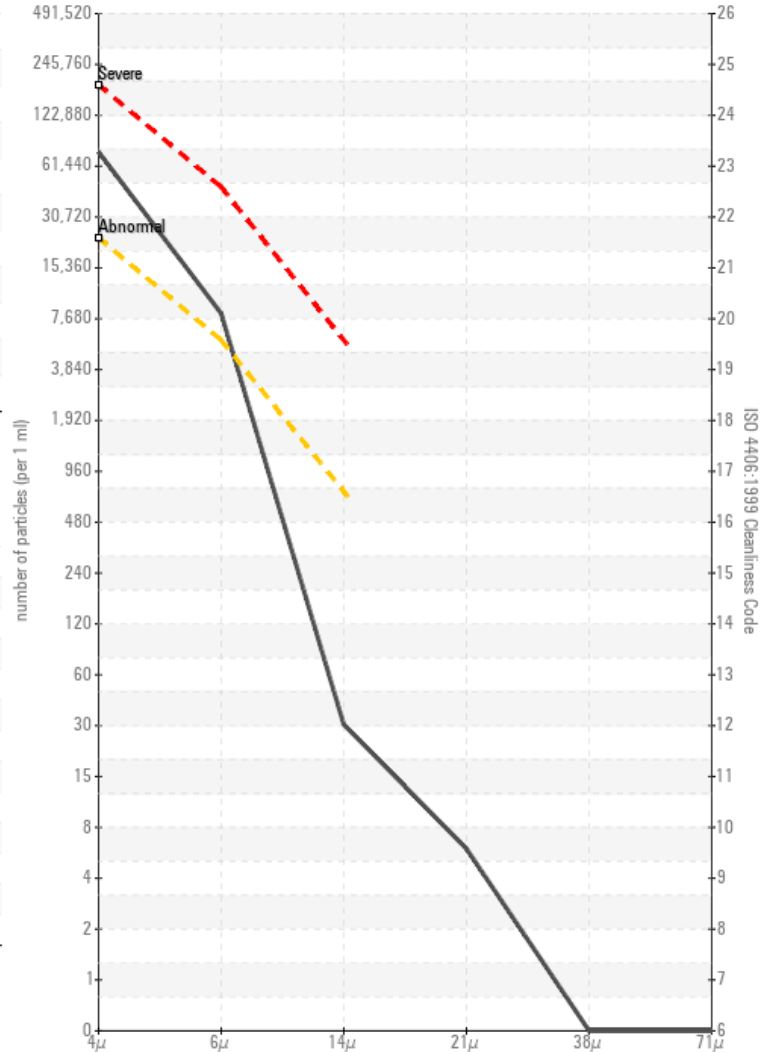
#### Non-ferrous Metals



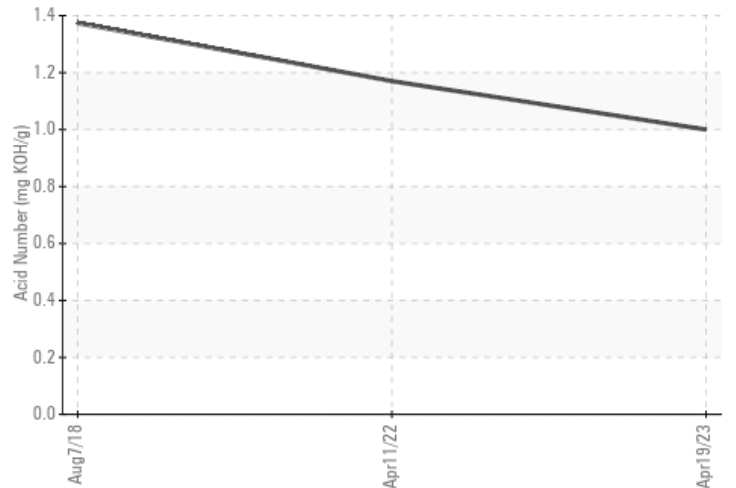
#### Viscosity @ 40°C



#### Particle Count



#### Acid Number



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR L550 1214-46296 - Front Differential

Sample No: LH0245004

Oil Type: GEAR OIL SAE 80W90



#### Sample Information

Sample Number	LH0245004	LH0236294	LH0207770	LHMC104376
Sample Date	19 Apr 2023	27 Oct 2022	11 Apr 2022	07 Aug 2018
Machine Hours	2422	2289	1507	448
Oil Hours	0	0	0	448
Oil Changed	Changed	Changed	Changed	Not Changd
Sample Status	NORMAL	NORMAL	ABNORMAL	ABNORMAL

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#### Oil Condition

Visc @ 40°C	cSt	164	141	191	194.5
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#### Contamination

Water	%	NEG	NEG	NEG	NEG
Silicon	ppm	2	4	17	19
Sodium	ppm	1	2	8	6
Potassium	ppm	0	0	0	<1

#### 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.



#### Wear Metals

Iron	ppm	73	204	344	325
Copper	ppm	9	38	135	63
Lead	ppm	0	0	<1	0
Tin	ppm	0	1	4	0
Aluminum	ppm	<1	1	2	1
Chromium	ppm	<1	1	3	2
Molybdenum	ppm	4	7	14	2
Nickel	ppm	0	0	<1	<1
Titanium	ppm	<1	0	0	0
Silver	ppm	0	0	<1	0
Manganese	ppm	5	11	36	31
Vanadium	ppm	0	0	0	0



#### Additives

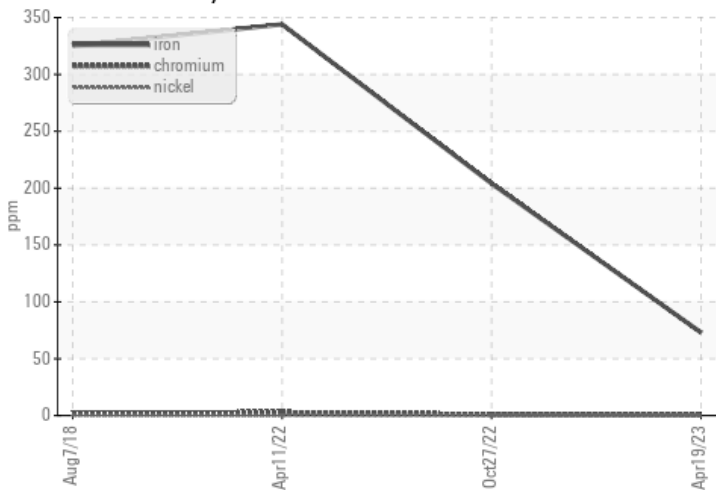
Calcium	ppm	31	40	12	6
Magnesium	ppm	11	9	2	0
Zinc	ppm	27	33	40	15
Phosphorus	ppm	1766	1109	2483	1958
Barium	ppm	0	0	0	0
Boron	ppm	17	52	5	9

Depot: LEC0007  
 Unique No: 10445731  
 Signed: Sean Felton  
 Report Date: 01 May 2023

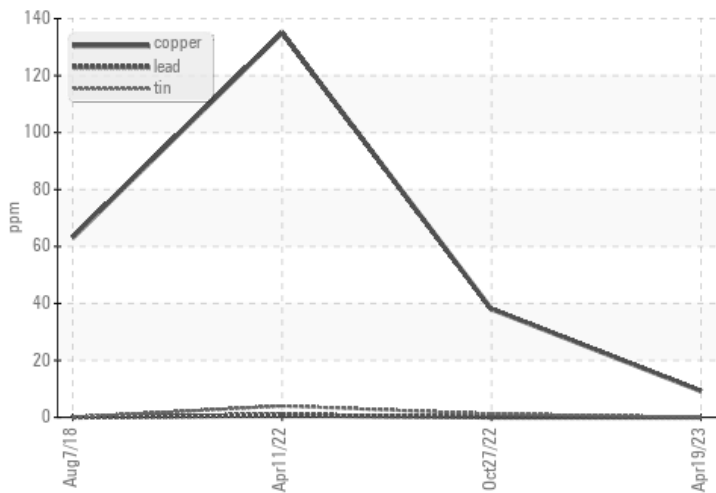


### Graphs

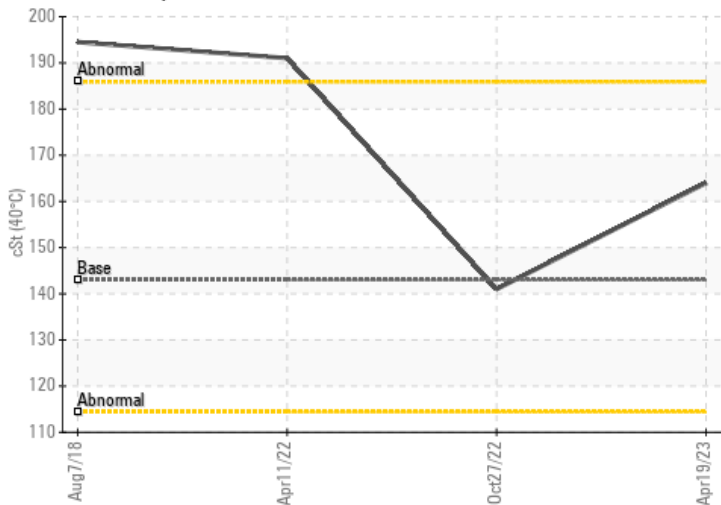
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C





# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR L550 1214-46296 - Splitter Box

Sample No: LH0245003

Oil Type: GEAR OIL SAE 80W90



#### Sample Information

Sample Number	LH0245003	LH0236298	LH0207522	LHMC104282
Sample Date	19 Apr 2023	27 Oct 2022	11 Apr 2022	07 Aug 2018
Machine Hours	2422	2289	1507	448
Oil Hours	0	0	0	448
Oil Changed	Changed	Changed	Changed	Not Changd
Sample Status	NORMAL	NORMAL	NORMAL	NORMAL

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#### Oil Condition

Visc @ 40°C	cSt	123	169	165	191.2
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#### Contamination

Water	%	NEG	NEG	NEG	NEG
Silicon	ppm	2	4	8	1
Sodium	ppm	1	1	8	11
Potassium	ppm	0	0	1	1

#### 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.



#### Wear Metals

Iron	ppm	38	37	144	122
Copper	ppm	<1	1	2	2
Lead	ppm	0	0	0	<1
Tin	ppm	0	0	0	0
Aluminum	ppm	1	2	8	3
Chromium	ppm	<1	<1	<1	<1
Molybdenum	ppm	8	2	11	2
Nickel	ppm	1	1	11	5
Titanium	ppm	1	0	<1	0
Silver	ppm	0	0	<1	0
Manganese	ppm	<1	1	8	10
Vanadium	ppm	0	0	0	0



#### Additives

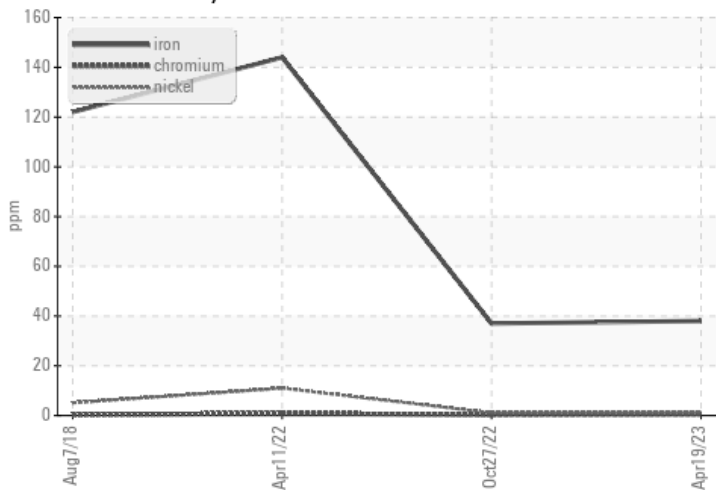
Calcium	ppm	38	20	43	16
Magnesium	ppm	20	2	13	3
Zinc	ppm	36	34	77	60
Phosphorus	ppm	641	2345	2122	1956
Barium	ppm	0	0	4	6
Boron	ppm	13	22	106	11

Depot: LEC0007  
 Unique No: 10445733  
 Signed: Sean Felton  
 Report Date: 01 May 2023

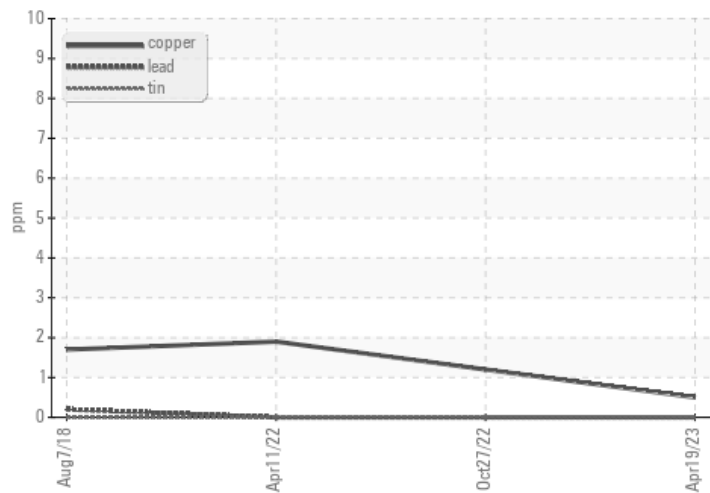


### Graphs

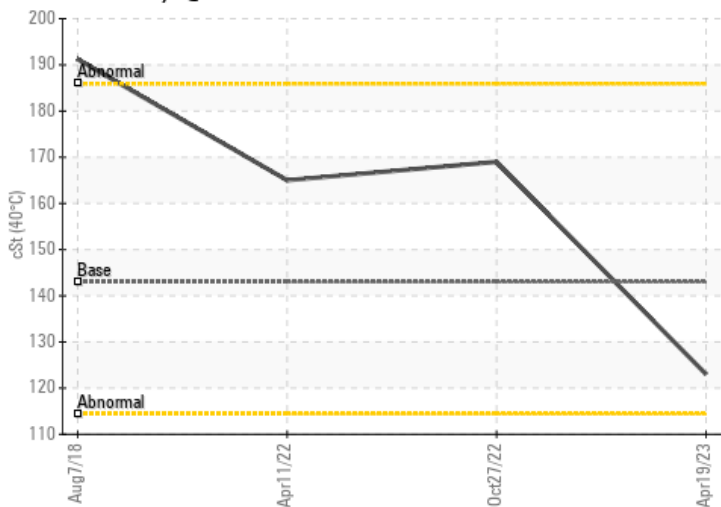
#### Ferrous Alloys



#### Non-ferrous Metals



#### Viscosity @ 40°C



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR L550 1214-46296 - Rear Differential

Sample No: LH0244269

Oil Type: GEAR OIL SAE 80W90



#### Sample Information

Sample Number	LH0244269	LH0236297	LH0207523	LHMC104287
Sample Date	19 Apr 2023	27 Oct 2022	11 Apr 2022	07 Aug 2018
Machine Hours	2422	2289	1507	448
Oil Hours	0	0	0	448
Oil Changed	Changed	Changed	Changed	Not Changd
Sample Status	NORMAL	ABNORMAL	ABNORMAL	NORMAL

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 F: (414)541-1892



#### Oil Condition

Visc @ 40°C	cSt	130	177	191	190.8
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#### Contamination

Water	%	NEG	NEG	NEG	NEG
Silicon	ppm	2	7	21	19
Sodium	ppm	<1	3	8	5
Potassium	ppm	0	6	0	1

#### 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.



#### Wear Metals

Iron	ppm	74	139	469	264
Copper	ppm	21	64	133	53
Lead	ppm	0	<1	1	<1
Tin	ppm	0	2	4	0
Aluminum	ppm	<1	1	2	<1
Chromium	ppm	<1	<1	4	2
Molybdenum	ppm	11	7	20	4
Nickel	ppm	0	<1	<1	<1
Titanium	ppm	<1	0	0	0
Silver	ppm	0	0	2	0
Manganese	ppm	7	14	46	29
Vanadium	ppm	0	0	0	0



#### Additives

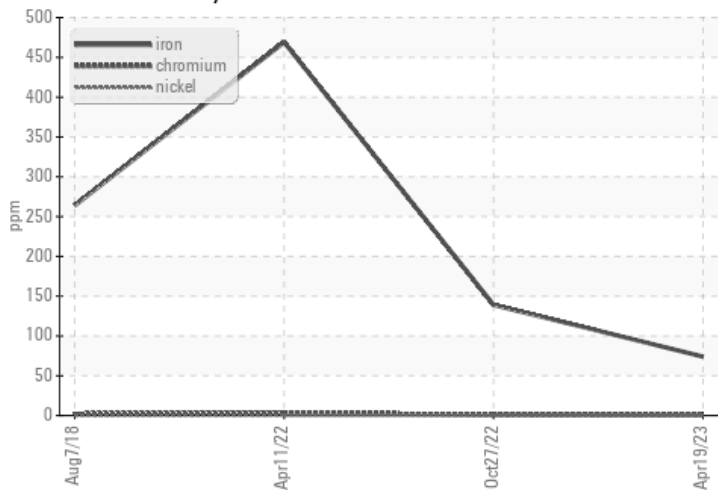
Calcium	ppm	42	11	11	5
Magnesium	ppm	25	2	4	0
Zinc	ppm	37	32	40	13
Phosphorus	ppm	750	2427	2509	1970
Barium	ppm	0	0	0	0
Boron	ppm	15	7	5	11

Depot: LEC0007  
 Unique No: 10445730  
 Signed: Sean Felton  
 Report Date: 01 May 2023

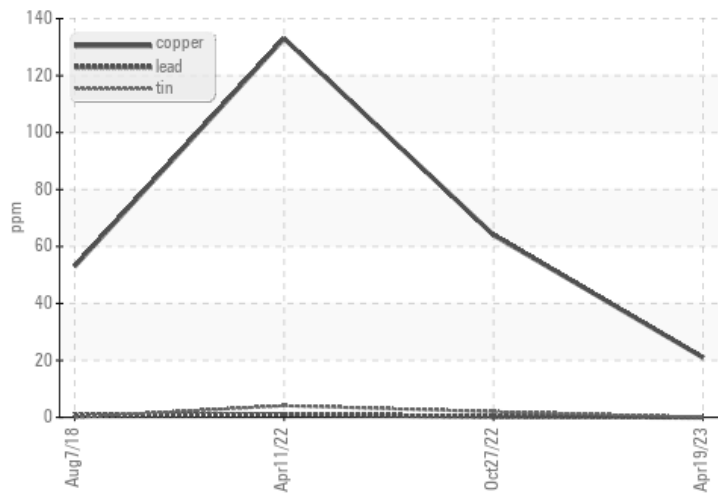


### Graphs

Ferrous Alloys



Non-ferrous Metals



Viscosity @ 40°C

