



### LIEBHERR R966 048797 - Diesel Engine

Sample No: LH

Oil Type: DIESEL ENGINE OIL



#### Information sur l'échantillon

Numéro d'échant.	LH	---	---	---
Date d'échant.	17 Apr 2023	---	---	---
Heures de la Machine	1611	---	---	---
Heures de l'huile	0	---	---	---
Huile changée	N/A	---	---	---
Statut de l'échant.	NORMAL	---	---	---

#### Liebherr Canada

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 Richmond, BC  
 CA V6W 1J8  
 Contact: Kevin Steer  
 kevin.steer@liebherr.com  
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#### État d'huile

Visc 100°C	cSt	● 11.8	---	---	---
Oxydation (PA)	%	68	---	---	---



#### Contamination

Eau	%	NEG	---	---	---
% de suie	%	● 0	---	---	---
Nitration (PA)	%	53	---	---	---
Sulfatation (PA)	%	54	---	---	---
Glycol	%	NEG	---	---	---
Essence	%	<1.0	---	---	---
Silicium	ppm	● 8	---	---	---
Sodium	ppm	● 4	---	---	---
Potassium	ppm	● 1	---	---	---

#### Diagnostic

Resample at the next service interval to monitor. The fluid was not specified, however, a fluid match indicates that this fluid is SAE 30 Diesel Engine Oil. Please confirm the oil type and grade, and specify the brand of the oil on your next sample. 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.



#### Métaux d'usure

Fer	ppm	● 5	---	---	---
Cuivre	ppm	● 5	---	---	---
Plomb	ppm	● <1	---	---	---
Étain	ppm	● 0	---	---	---
Aluminium	ppm	● 1	---	---	---
Chrome	ppm	● 0	---	---	---
Molybdène	ppm	● 56	---	---	---
Nickel	ppm	● 0	---	---	---
Titane	ppm	<1	---	---	---
Argent	ppm	● 0	---	---	---
Manganèse	ppm	● <1	---	---	---
Vanadium	ppm	0	---	---	---



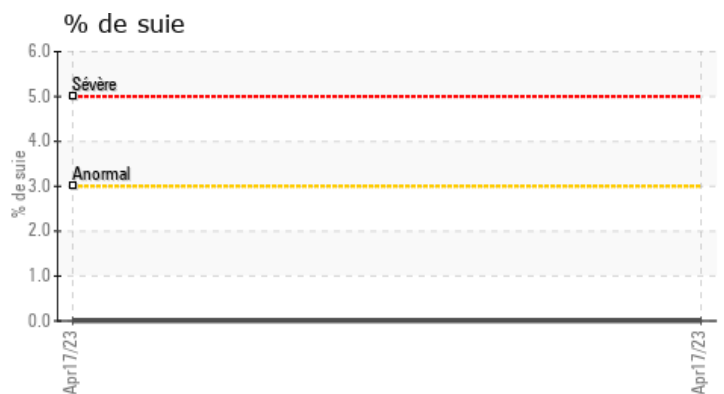
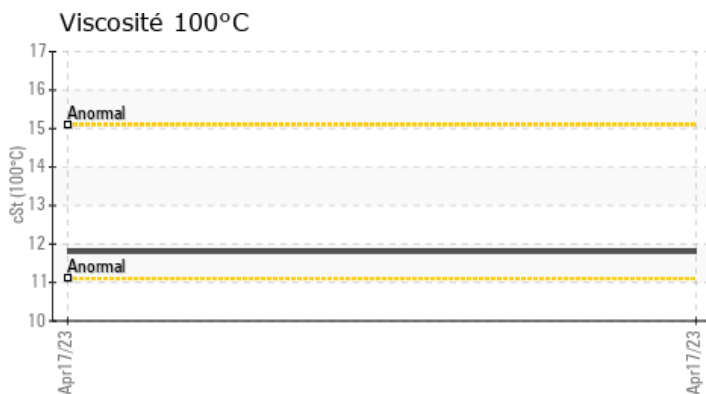
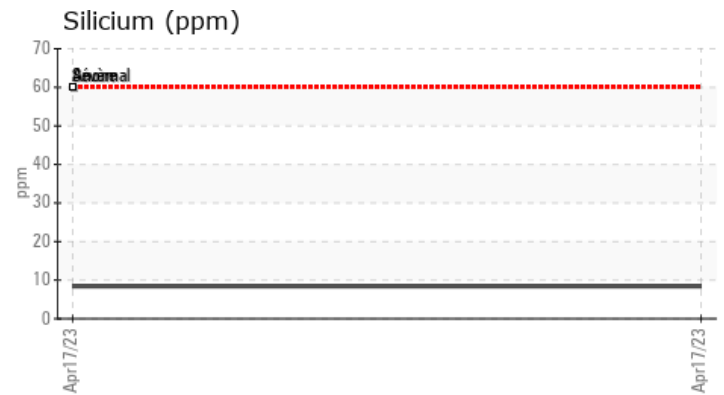
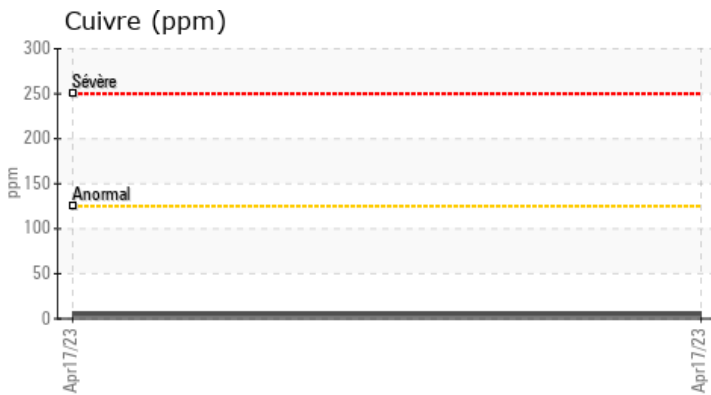
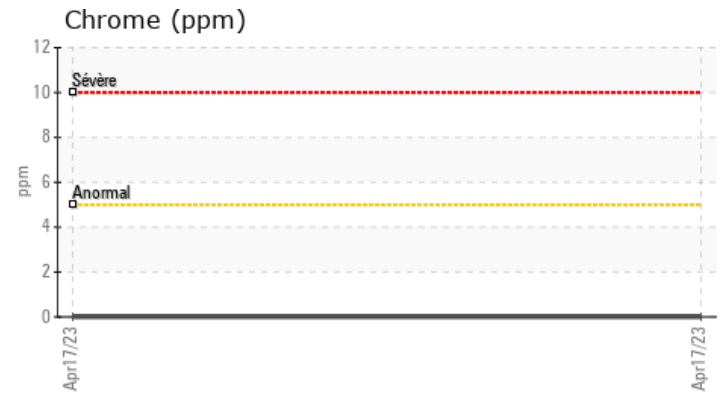
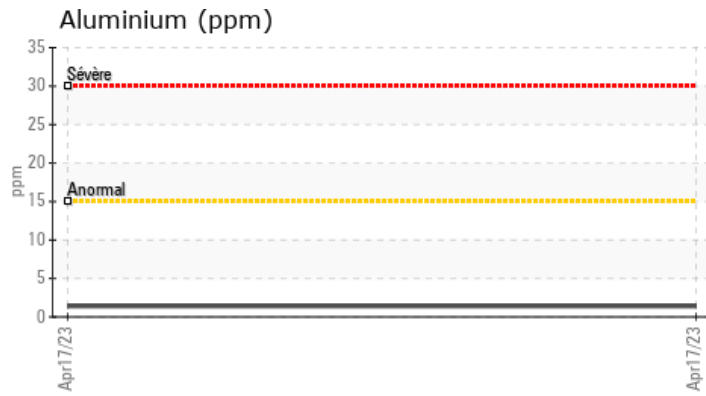
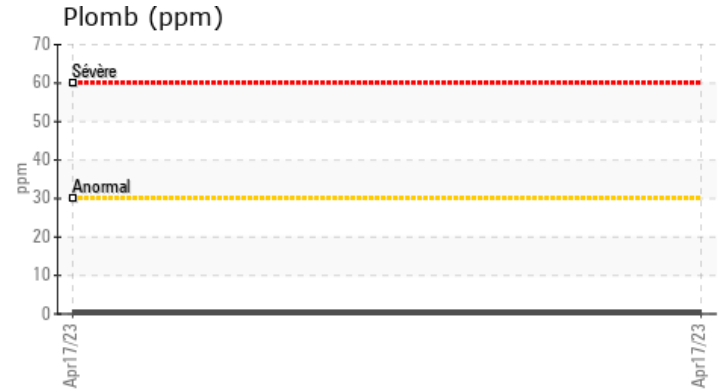
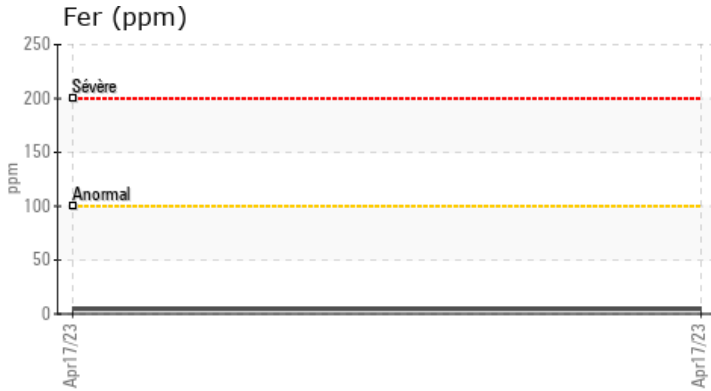
#### Additifs

Calcium	ppm	1012	---	---	---
Magnésium	ppm	1041	---	---	---
Zinc	ppm	● 1151	---	---	---
Phosphore	ppm	● 1092	---	---	---
Baryum	ppm	● <1	---	---	---
Bore	ppm	● 60	---	---	---

Depot: LIERIC  
 Unique No: 5565031  
 Signed: Wes Davis  
 Report Date: 18 Apr 2023



### Graphs



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR R966 048797 - Diesel Fuel

Sample No: LH0194275

Oil Type: No.2 DIESEL FUEL (ULTRALOW SULPHUR)



#### Information sur l'échantillon

Numéro d'échant.		LH0194275	---	---	---
Date d'échant.		11 May 2023	---	---	---
Heures de la Machine		0	---	---	---
Statut de l'échant.		ABNORMAL	---	---	---

#### Liebherr Canada

140 - 21320 Gordon Way  
 Richmond, BC  
 CA V6W 1J8  
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 kevin.steer@liebherr.com  
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#### État du carburant

Point d'ébullition initial	°C	154	---	---	---
Point de distillation de 10%	°C	182	---	---	---
Point de distillation de 20%	°C	198	---	---	---
Point de distillation de 30%	°C	213	---	---	---
Point de distillation de 40%	°C	227	---	---	---
Point de distillation de 50%	°C	242	---	---	---
Point de distillation de 60%	°C	257	---	---	---
Point de distillation de 70%	°C	272	---	---	---
Point de distillation de 80%	°C	290	---	---	---
Point de distillation de 90%	°C	313	---	---	---
Point d'ébullition final	°C	355	---	---	---
Indice de cétane		49	---	---	---
Densité API		40	---	---	---
Soufre	ppm	6	---	---	---
Visc 40°C	cSt	2.1	---	---	---
Couleur du carburant	text	Red	---	---	---

#### Diagnostic

Laboratory test indicate that this fuel is suitable for use and meets all test requirements. We advise that you filter this fluid before use. We recommend you service the filters on this component. We recommend an early resample to monitor this condition. {not applicable} There is a moderate amount of silt (particulates < 14 microns in size) present in the fuel. The water content is negligible. All laboratory tests indicate that this sample meets specifications for No.2 ultra-low-sulfur diesel fuel (US EPA/CGSB-3.517-3 type B). The fuel is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



#### Contamination

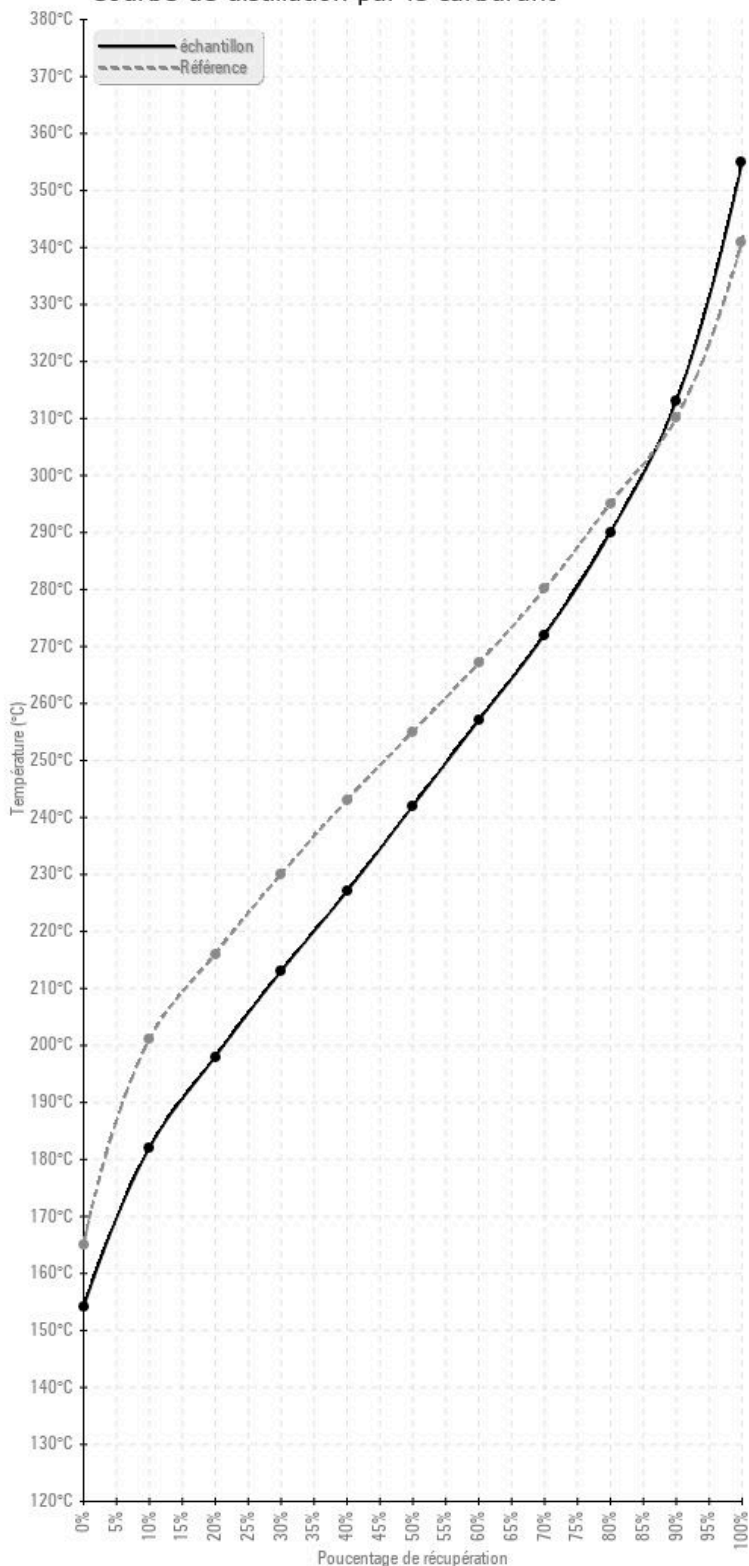
Eau	%	0.004	---	---	---
Plomb	ppm	0	---	---	---
Nickel	ppm	0	---	---	---
Aluminium	ppm	0	---	---	---
Vanadium	ppm	0	---	---	---
Silicium	ppm	0	---	---	---

Depot: LIERIC  
 Unique No: 5578372  
 Signed: Kevin Marson  
 Report Date: 16 May 2023

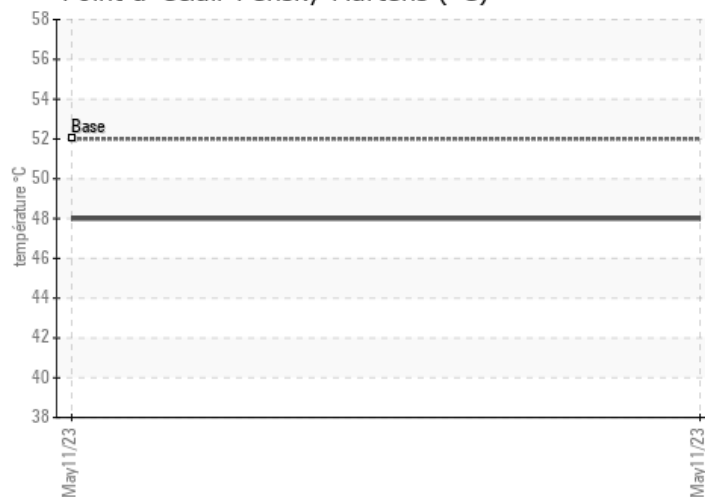


### Graphs

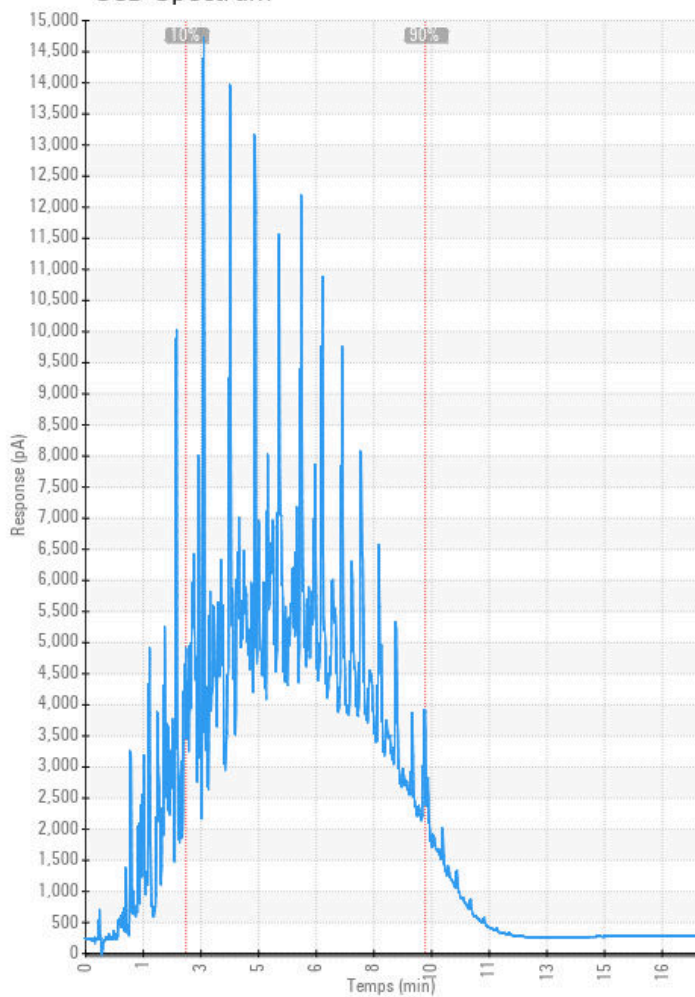
Courbe de distillation par le carburant



Point d'éclair Pensky-Martens (°C)



GCD Spectrum





### LIEBHERR R966 048797 - Hydraulic System

Sample No: LH

Oil Type: AW HYDRAULIC OIL ISO 46



#### Information sur l'échantillon

Numéro d'échant.	LH	---	---	---
Date d'échant.	17 Apr 2023	---	---	---
Heures de la Machine	1611	---	---	---
Heures de l'huile	0	---	---	---
Huile changée	N/A	---	---	---
Statut de l'échant.	NORMAL	---	---	---

#### Liebherr Canada

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 Richmond, BC  
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 Contact: Kevin Steer  
 kevin.steer@liebherr.com  
 T:  
 F: (604)270-3254



#### État d'huile

Visc 40°C	cSt	● 46.0	---	---	---
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#### Contamination

Eau	%	NEG	---	---	---
Particules >4μ		● 16278	---	---	---
Particules >6μ		● 2860	---	---	---
Particules >14μ		● 175	---	---	---
ISO 4406:1999 (c)		21/19/15	---	---	---
Silicium	ppm	● 2	---	---	---
Sodium	ppm	● 6	---	---	---
Potassium	ppm	● 2	---	---	---

#### Diagnostic

Resample at the next service interval to monitor. All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The condition of the oil is acceptable for the time in service.



#### Métaux d'usure

Fer	ppm	● 11	---	---	---
Cuivre	ppm	● 11	---	---	---
Plomb	ppm	● 1	---	---	---
Étain	ppm	● 0	---	---	---
Aluminium	ppm	● 1	---	---	---
Chrome	ppm	● 0	---	---	---
Molybdène	ppm	● 0	---	---	---
Nickel	ppm	● <1	---	---	---
Titane	ppm	0	---	---	---
Argent	ppm	0	---	---	---
Manganèse	ppm	● <1	---	---	---
Vanadium	ppm	0	---	---	---



#### Additifs

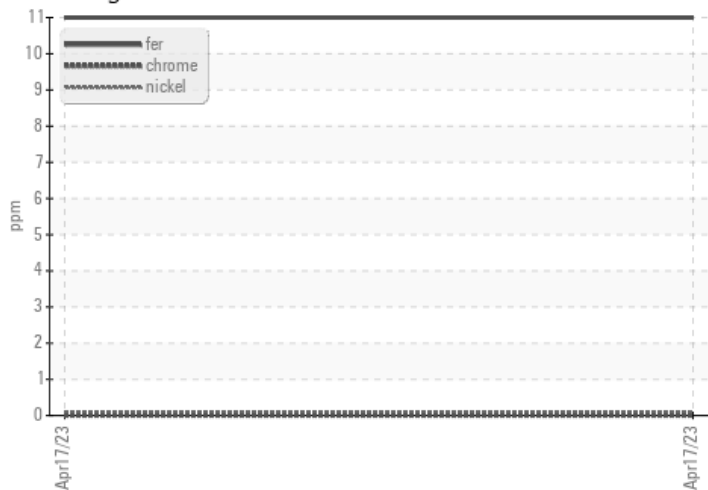
Calcium	ppm	967	---	---	---
Magnésium	ppm	● 14	---	---	---
Zinc	ppm	● 587	---	---	---
Phosphore	ppm	● 574	---	---	---
Baryum	ppm	● 0	---	---	---
Bore	ppm	● <1	---	---	---

Depot: LIERIC  
 Unique No: 5565112  
 Signed: Kevin Marson  
 Report Date: 19 Apr 2023

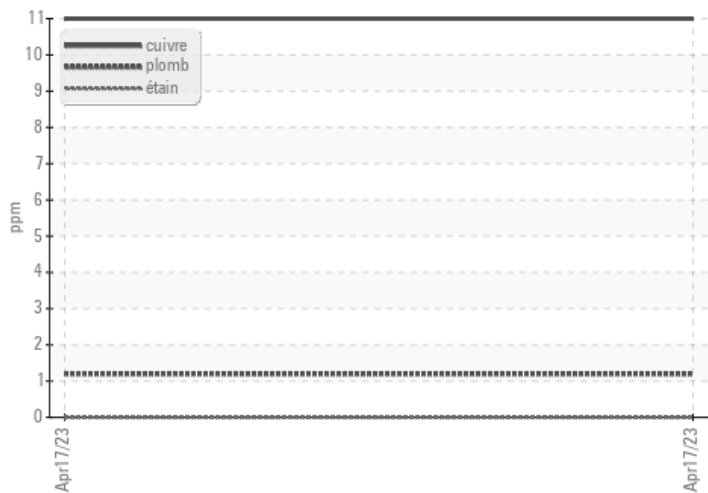


### Graphs

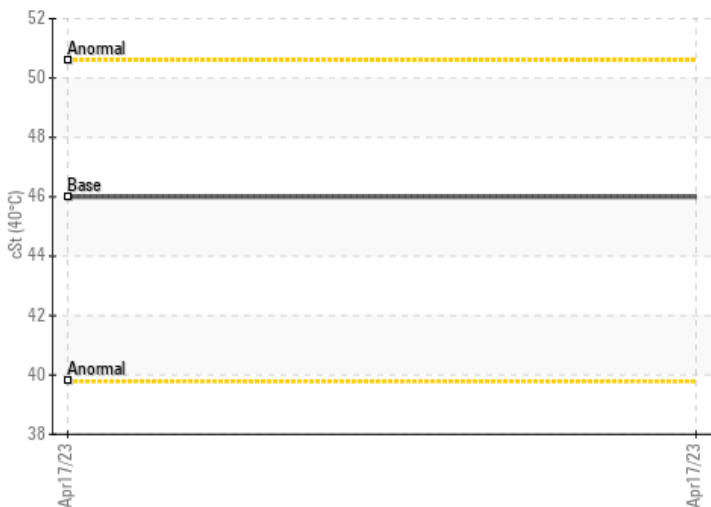
Alliages ferreux



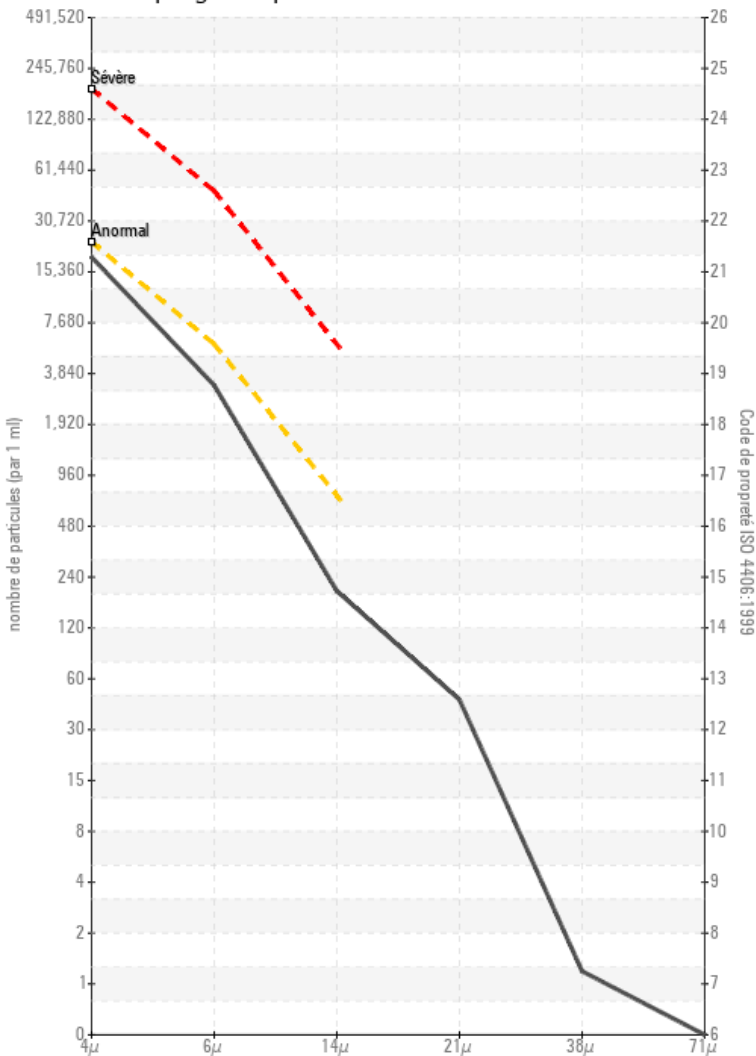
Métaux non-ferreux



Viscosité 40°C



Comptage de particules



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR R966 048797 - Swing Drive

Sample No: LH

Oil Type: Swing Drive Oil



#### Information sur l'échantillon

Numéro d'échant.	LH	---	---	---
Date d'échant.	17 Apr 2023	---	---	---
Heures de la Machine	1611	---	---	---
Heures de l'huile	0	---	---	---
Huile changée	N/A	---	---	---
Statut de l'échant.	NORMAL	---	---	---

#### Liebherr Canada

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 Richmond, BC  
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 Contact: Kevin Steer  
 kevin.steer@liebherr.com  
 T:  
 F: (604)270-3254



#### État d'huile

Visc 40°C	cSt	● 185	---	---	---
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#### Contamination

Eau	%	NEG	---	---	---
Silicium	ppm	● 1	---	---	---
Sodium	ppm	● 2	---	---	---
Potassium	ppm	● <1	---	---	---



#### Métaux d'usure

Fer	ppm	● 38	---	---	---
Cuivre	ppm	● 72	---	---	---
Plomb	ppm	● 2	---	---	---
Étain	ppm	● <1	---	---	---
Aluminium	ppm	● 0	---	---	---
Chrome	ppm	● 0	---	---	---
Molybdène	ppm	● 0	---	---	---
Nickel	ppm	● <1	---	---	---
Titane	ppm	0	---	---	---
Argent	ppm	0	---	---	---
Manganèse	ppm	● <1	---	---	---
Vanadium	ppm	0	---	---	---



#### Additifs

Calcium	ppm	● 13	---	---	---
Magnésium	ppm	● 32	---	---	---
Zinc	ppm	● 52	---	---	---
Phosphore	ppm	● 2367	---	---	---
Baryum	ppm	● 0	---	---	---
Bore	ppm	● 34	---	---	---

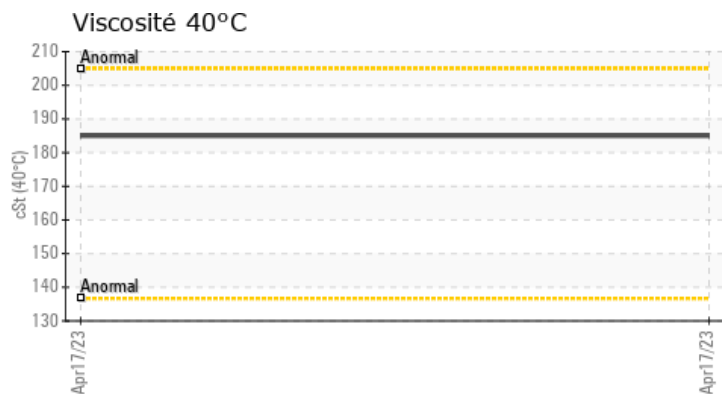
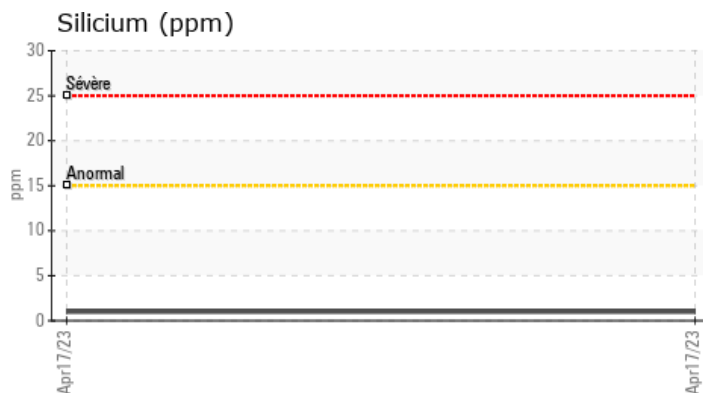
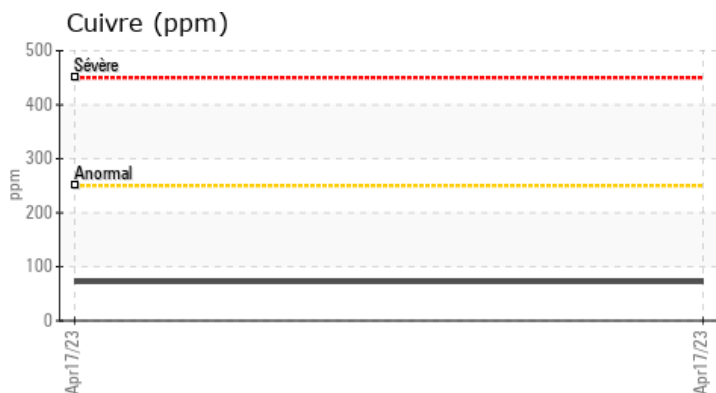
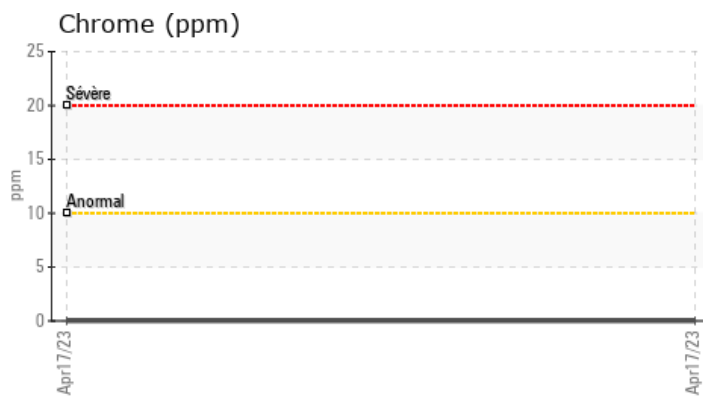
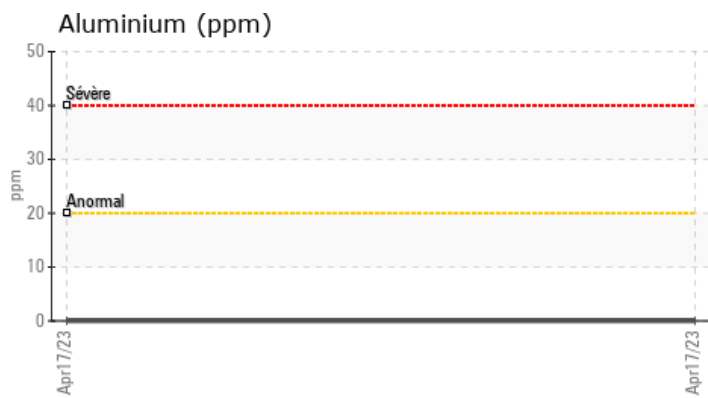
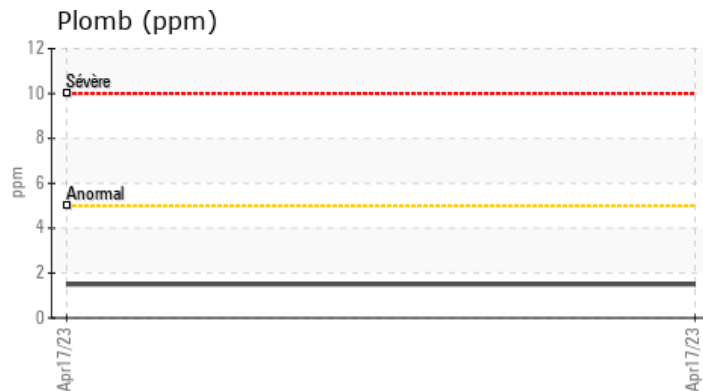
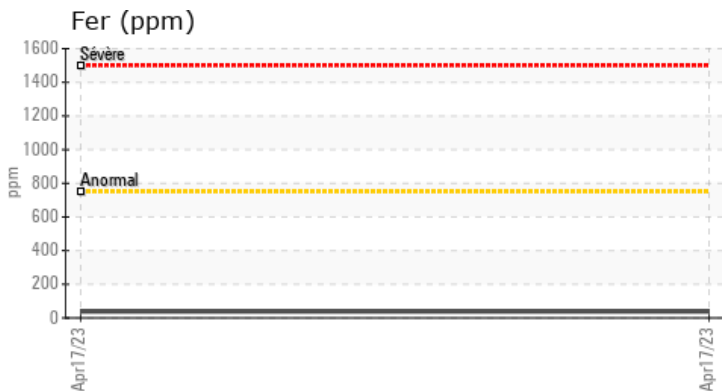
#### Diagnostic

Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. The fluid was not specified, however, a fluid match indicates that this fluid is SAE 80W90 Gear Oil. Please confirm the oil type and grade, and specify the brand of the oil on your next sample. All component wear rates are normal. There is no indication of any contamination in the oil. Additive levels indicate the addition of a different brand, or type of oil. The condition of the oil is acceptable for the time in service.

Depot: LIERIC  
 Unique No: 5565175  
 Signed: Kevin Marson  
 Report Date: 18 Apr 2023



### Graphs







### LIEBHERR R966 048797 - Left Final Drive

Sample No: LH

Oil Type: Final Drive Oil



#### Information sur l'échantillon

Numéro d'échant.	LH	---	---	---
Date d'échant.	17 Apr 2023	---	---	---
Heures de la Machine	1611	---	---	---
Heures de l'huile	0	---	---	---
Huile changée	N/A	---	---	---
Statut de l'échant.	NORMAL	---	---	---

#### Liebherr Canada

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 Contact: Kevin Steer  
 kevin.steer@liebherr.com  
 T:  
 F: (604)270-3254



#### État d'huile

Visc 40°C	cSt	● 193	---	---	---
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#### Contamination

Eau	%	NEG	---	---	---
Silicium	ppm	● 14	---	---	---
Sodium	ppm	● 9	---	---	---
Potassium	ppm	● 3	---	---	---



#### Métaux d'usure

Fer	ppm	● 145	---	---	---
Cuivre	ppm	● 4	---	---	---
Plomb	ppm	● 0	---	---	---
Étain	ppm	● 0	---	---	---
Aluminium	ppm	● 2	---	---	---
Chrome	ppm	● 2	---	---	---
Molybdène	ppm	● 0	---	---	---
Nickel	ppm	● 1	---	---	---
Titane	ppm	<1	---	---	---
Argent	ppm	0	---	---	---
Manganèse	ppm	● 3	---	---	---
Vanadium	ppm	0	---	---	---



#### Additifs

Calcium	ppm	● 103	---	---	---
Magnésium	ppm	● 3	---	---	---
Zinc	ppm	● 25	---	---	---
Phosphore	ppm	● 2241	---	---	---
Baryum	ppm	● 0	---	---	---
Bore	ppm	● 2	---	---	---

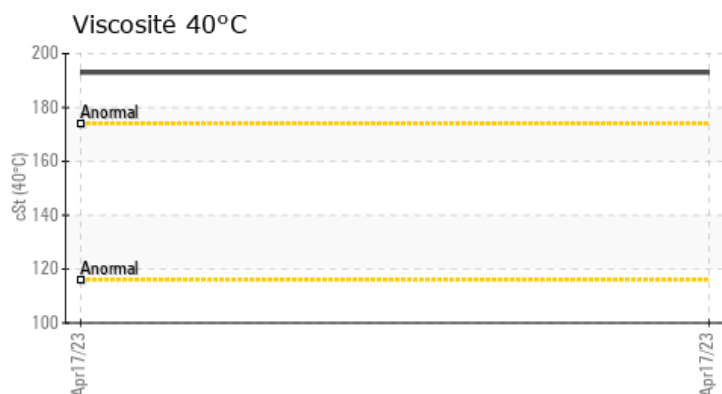
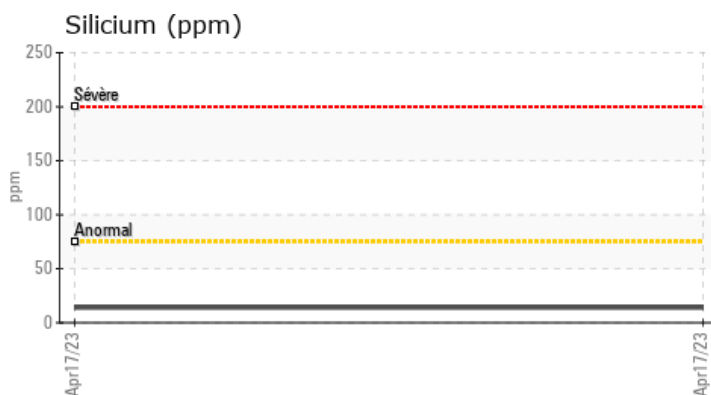
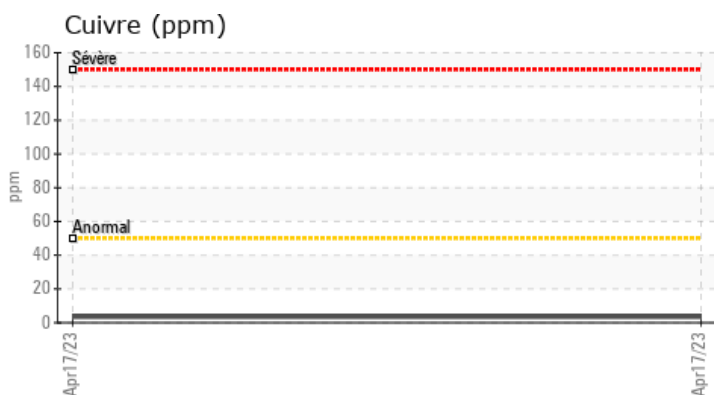
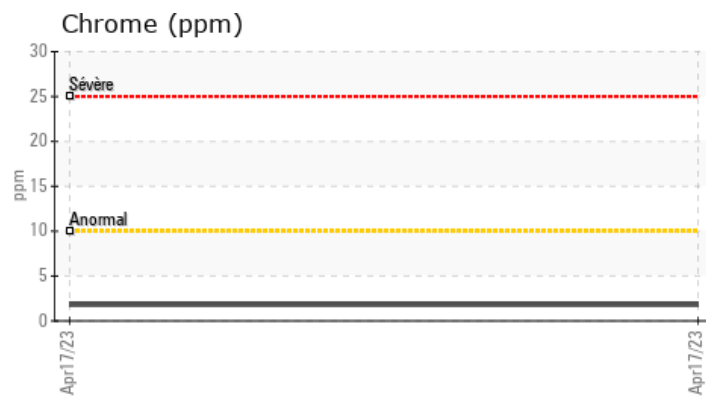
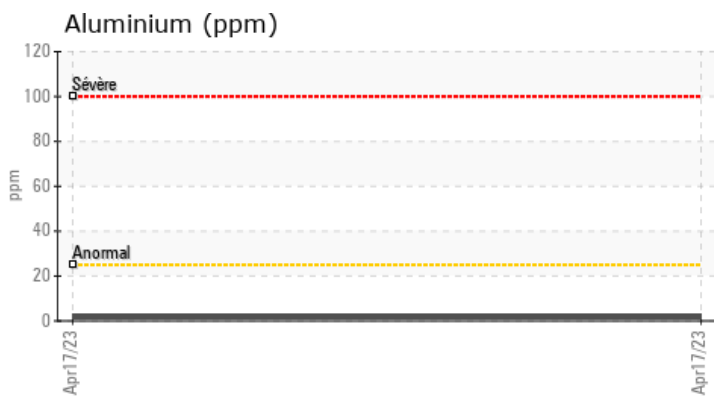
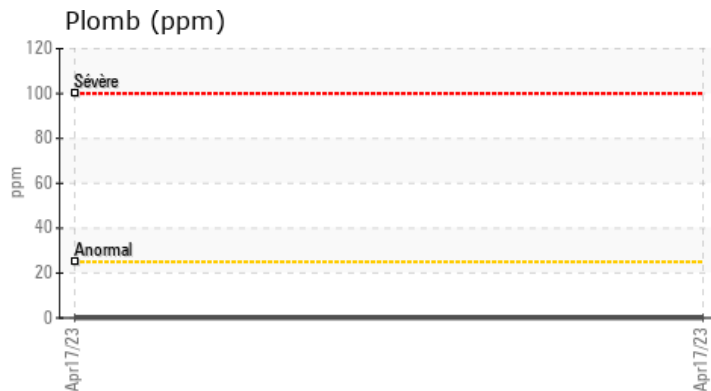
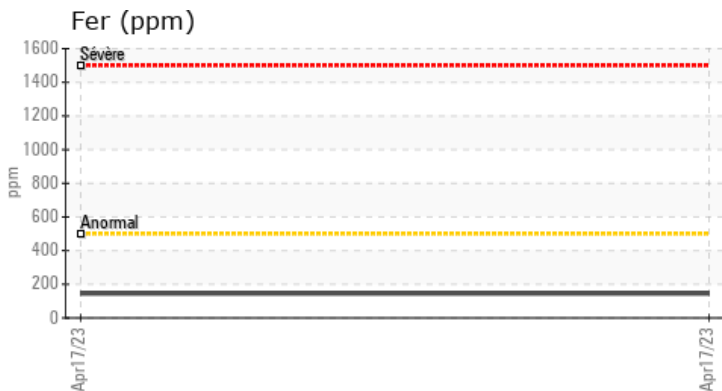
#### Diagnostic

Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. The fluid was not specified, however, a fluid match indicates that this fluid is SAE 80W90 Gear Oil. Please confirm the oil type and grade, and specify the brand of the oil on your next sample. The fluid was specified as (GENERIC COMPONENT) Final Drive Oil, however, a fluid match indicates that this fluid is SAE 80W90 Gear Oil. Please confirm the oil type and grade on your next sample. All component wear rates are normal. There is no indication of any contamination in the oil. Viscosity of sample indicates oil is within SAE 80W90 range, advise investigate. This plus the additive levels indicates that this is not the same brand, or type of oil as reported. The condition of the oil is acceptable for the time in service.

Depot: LIERIC  
 Unique No: 5565174  
 Signed: Kevin Marson  
 Report Date: 18 Apr 2023



### Graphs



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR R966 048797 - Splitter Box

Sample No: LH

Oil Type: Splitter Box Oil



#### Information sur l'échantillon

Numéro d'échant.	LH	---	---	---
Date d'échant.	17 Apr 2023	---	---	---
Heures de la Machine	1611	---	---	---
Heures de l'huile	0	---	---	---
Huile changée	N/A	---	---	---
Statut de l'échant.	NORMAL	---	---	---

#### Liebherr Canada

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 Richmond, BC  
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 Contact: Kevin Steer  
 kevin.steer@liebherr.com  
 T:  
 F: (604)270-3254



#### État d'huile

Visc 40°C	cSt	● 193	---	---	---
-----------	-----	-------	-----	-----	-----



#### Contamination

Eau	%	NEG	---	---	---
Silicium	ppm	● 1	---	---	---
Sodium	ppm	● 1	---	---	---
Potassium	ppm	● <1	---	---	---



#### Métaux d'usure

Fer	ppm	● 3	---	---	---
Cuivre	ppm	● <1	---	---	---
Plomb	ppm	● 0	---	---	---
Étain	ppm	● 0	---	---	---
Aluminium	ppm	● 0	---	---	---
Chrome	ppm	● 0	---	---	---
Molybdène	ppm	● <1	---	---	---
Nickel	ppm	● <1	---	---	---
Titane	ppm	● 0	---	---	---
Argent	ppm	● 0	---	---	---
Manganèse	ppm	● <1	---	---	---
Vanadium	ppm	● 0	---	---	---



#### Additifs

Calcium	ppm	● 10	---	---	---
Magnésium	ppm	● 4	---	---	---
Zinc	ppm	● 13	---	---	---
Phosphore	ppm	● 2518	---	---	---
Baryum	ppm	● 0	---	---	---
Bore	ppm	● 2	---	---	---

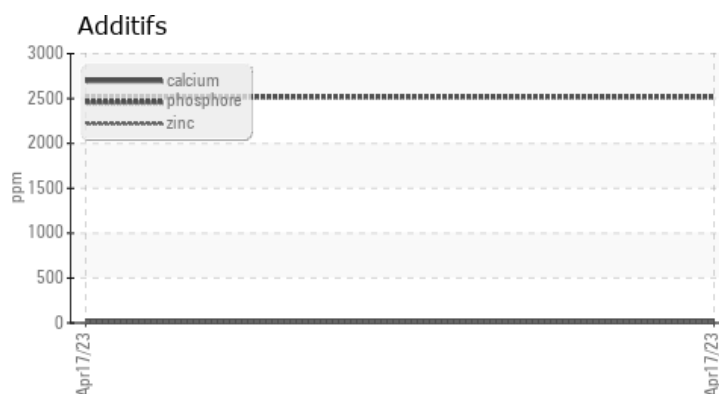
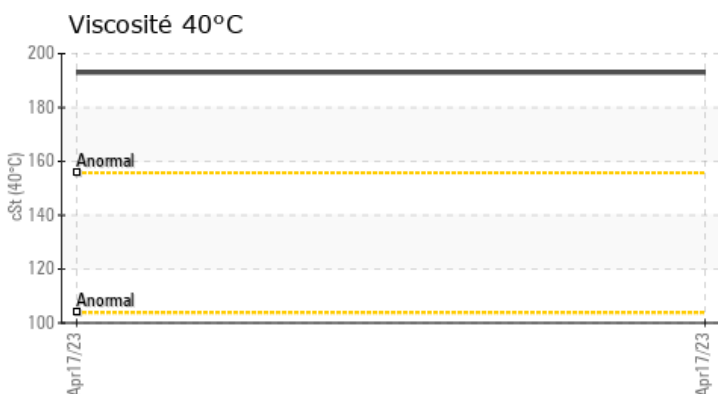
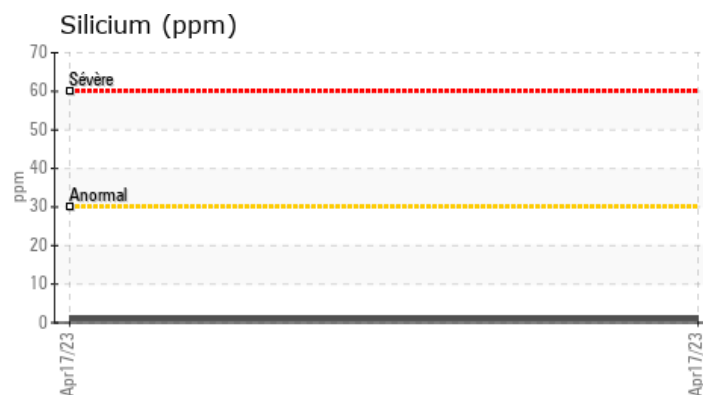
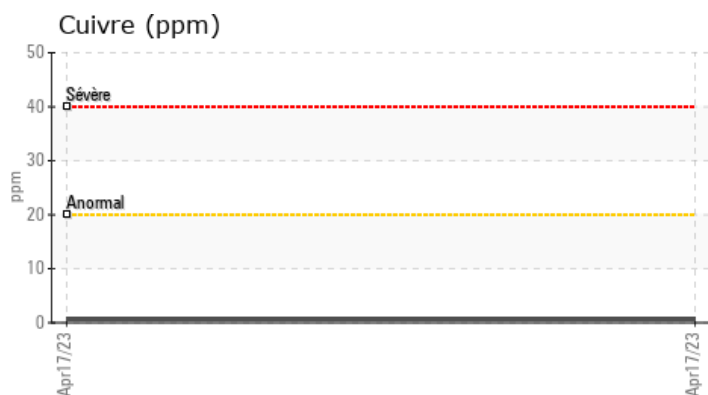
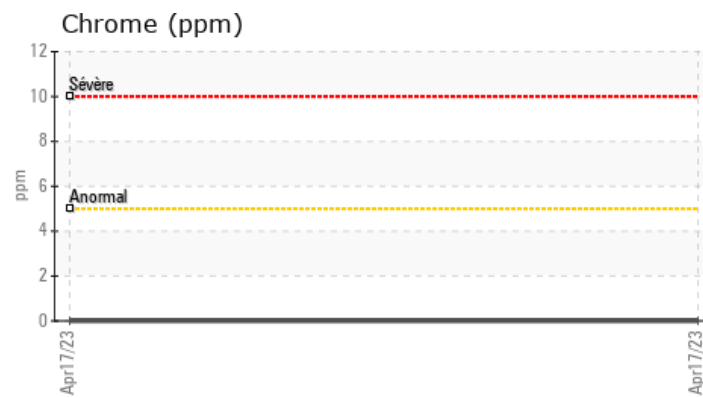
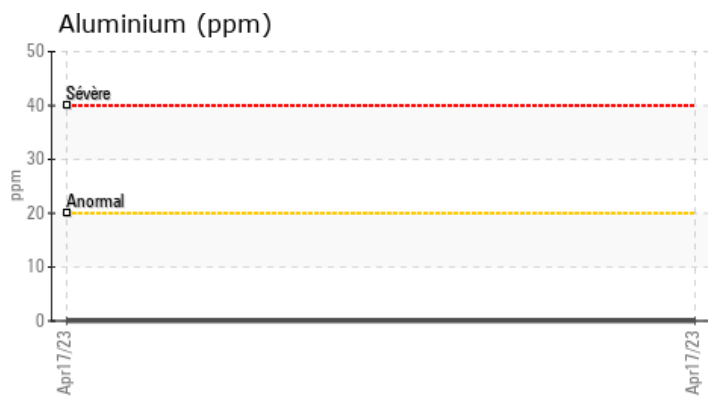
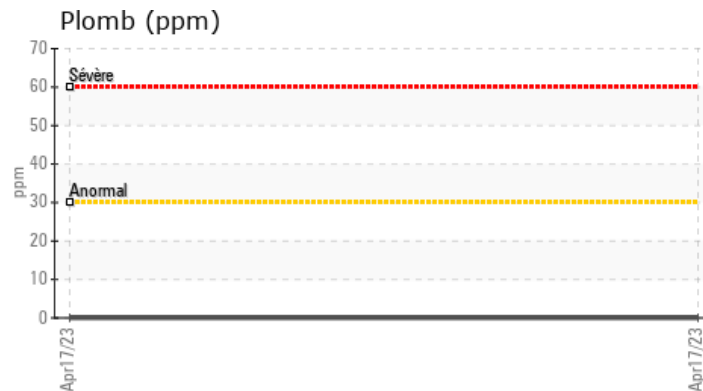
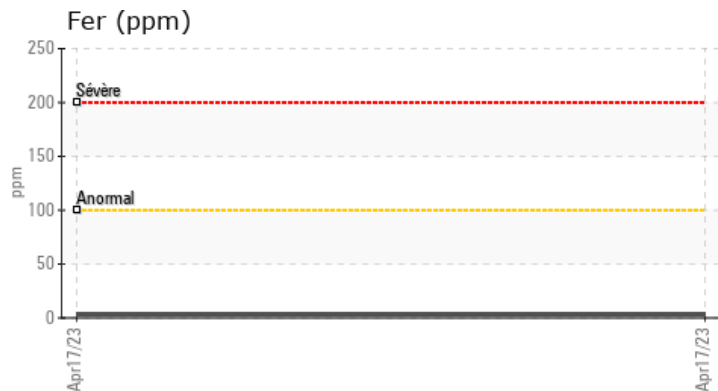
#### Diagnostic

Confirm the source of the lubricant being utilized for top-up/fill. 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. There is no indication of any contamination in the oil. Viscosity of sample indicates oil is within SAE 80W90 range, advise investigate. This plus the additive levels indicates that this is not the same brand, or type of oil as reported. The condition of the oil is acceptable for the time in service.

Depot: LIERIC  
 Unique No: 5565176  
 Signed: Kevin Marson  
 Report Date: 18 Apr 2023



### Graphs



# LIEBHERR

## CONSTRUCTION EQUIPMENT



### LIEBHERR R966 048797 - Right Final Drive

Sample No: LH

Oil Type: Final Drive Oil



#### Information sur l'échantillon

Numéro d'échant.	LH	---	---	---
Date d'échant.	17 Apr 2023	---	---	---
Heures de la Machine	1611	---	---	---
Heures de l'huile	0	---	---	---
Huile changée	N/A	---	---	---
Statut de l'échant.	NORMAL	---	---	---

#### Liebherr Canada

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 Richmond, BC  
 CA V6W 1J8  
 Contact: Kevin Steer  
 kevin.steer@liebherr.com  
 T:  
 F: (604)270-3254



#### État d'huile

Visc 40°C	cSt	● 194	---	---	---
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#### Contamination

Eau	%	NEG	---	---	---
Silicium	ppm	● 39	---	---	---
Sodium	ppm	● 9	---	---	---
Potassium	ppm	● 4	---	---	---



#### Métaux d'usure

Fer	ppm	● 178	---	---	---
Cuivre	ppm	● <1	---	---	---
Plomb	ppm	● 0	---	---	---
Étain	ppm	● 0	---	---	---
Aluminium	ppm	● 4	---	---	---
Chrome	ppm	● 2	---	---	---
Molybdène	ppm	● 0	---	---	---
Nickel	ppm	● 2	---	---	---
Titane	ppm	<1	---	---	---
Argent	ppm	0	---	---	---
Manganèse	ppm	● 3	---	---	---
Vanadium	ppm	<1	---	---	---



#### Additifs

Calcium	ppm	● 203	---	---	---
Magnésium	ppm	● 3	---	---	---
Zinc	ppm	● 24	---	---	---
Phosphore	ppm	● 2272	---	---	---
Baryum	ppm	● 0	---	---	---
Bore	ppm	● 1	---	---	---

#### Diagnostic

Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. The fluid was not specified, however, a fluid match indicates that this fluid is SAE 80W90 Gear Oil. Please confirm the oil type and grade, and specify the brand of the oil on your next sample. The fluid was specified as (GENERIC COMPONENT) Final Drive Oil, however, a fluid match indicates that this fluid is SAE 80W90 Gear Oil. Please confirm the oil type and grade on your next sample. All component wear rates are normal. There is no indication of any contamination in the oil. Viscosity of sample indicates oil is within SAE 80W90 range, advise investigate. This plus the additive levels indicates that this is not the same brand, or type of oil as reported. The condition of the oil is acceptable for the time in service.

Depot: LIERIC  
 Unique No: 5565173  
 Signed: Kevin Marson  
 Report Date: 18 Apr 2023



### Graphs

