



LIEBHERR

OIL ANALYSIS REPORT



Area
[CLEVELAND CLIFFS]
 Machine Id
LIEBHERR LH60M 1217-96222
 Component
Diesel Engine
 Fluid
DIESEL ENGINE OIL SAE 5W40 (--- GAL)

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		LH0258853	LH0200086	LHMC119743
Sample Date		Client Info		05 Apr 2024	15 Mar 2023	27 Aug 2019
Machine Age	hrs	Client Info		8533	8059	7502
Oil Age	hrs	Client Info		500	0	0
Filter Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		Changed	Changed	N/A
Filter Changed		Client Info		Changed	Changed	N/A
Sample Status				NORMAL	NORMAL	NORMAL

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>100	8	8	7
Chromium	ppm	ASTM D5185m	>5	0	<1	<1
Nickel	ppm	ASTM D5185m	>5	0	<1	0
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m	>3	0	0	<1
Aluminum	ppm	ASTM D5185m	>15	1	2	3
Lead	ppm	ASTM D5185m	>30	0	<1	1
Copper	ppm	ASTM D5185m	>125	4	9	10
Tin	ppm	ASTM D5185m	>5	0	<1	<1
Vanadium	ppm	ASTM D5185m		0	<1	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

There is no indication of any contamination in the oil.

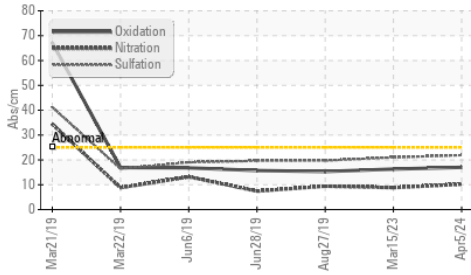
Silicon	ppm	ASTM D5185m	>60	10	10	10
Potassium	ppm	ASTM D5185m	>20	3	7	6
Fuel	%	ASTM D3524	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844	>3	0.1	0.1	0.1
Nitration	Abs/cm	*ASTM D7624	>20	10.2	8.8	9.4
Sulfation	Abs/.1mm	*ASTM D7415	>30	21.9	21.0	19.7
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG

FLUID CONDITION

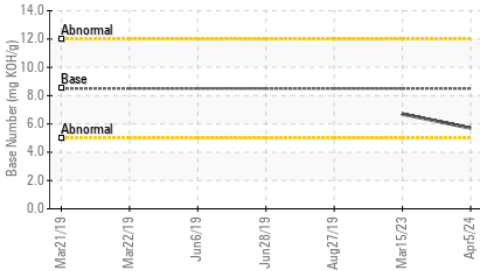
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185m	>44	2	3	2
Boron	ppm	ASTM D5185m	250	71	151	127
Barium	ppm	ASTM D5185m	10	<1	0	0
Molybdenum	ppm	ASTM D5185m	100	22	26	30
Manganese	ppm	ASTM D5185m		0	<1	<1
Magnesium	ppm	ASTM D5185m	450	579	106	100
Calcium	ppm	ASTM D5185m	3000	1525	2036	2526
Phosphorus	ppm	ASTM D5185m	1150	820	925	922
Zinc	ppm	ASTM D5185m	1350	927	1129	1054
Sulfur	ppm	ASTM D5185m	4250	3641	3380	2542
Oxidation	Abs/.1mm	*ASTM D7414	>25	17.0	16.3	15.3
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	5.7	6.7	---
Visc @ 100°C	cSt	ASTM D445	14.4	12.1	12.5	12.0

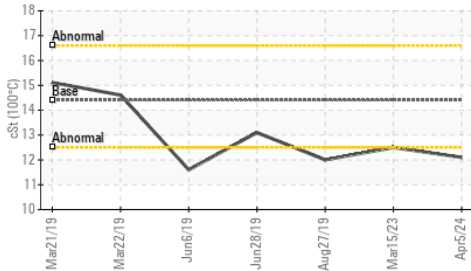
FT-IR (Direct Trend)



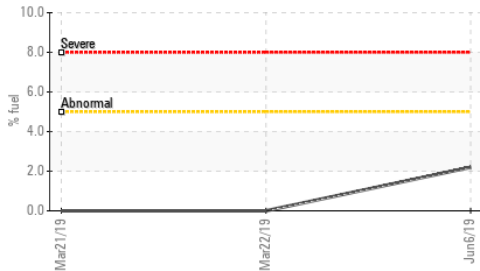
Base Number



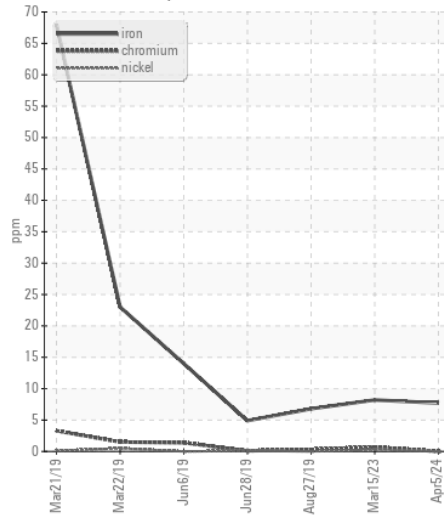
Viscosity @ 100°C



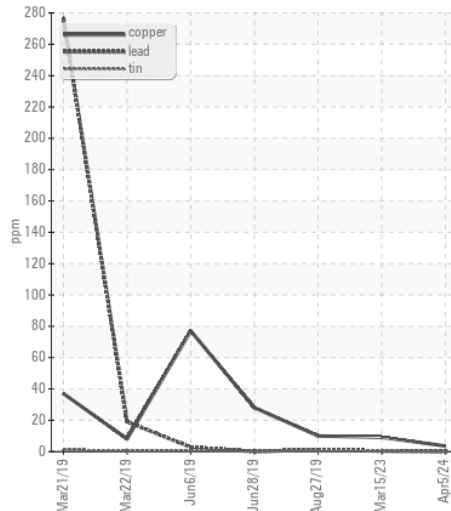
Fuel Dilution



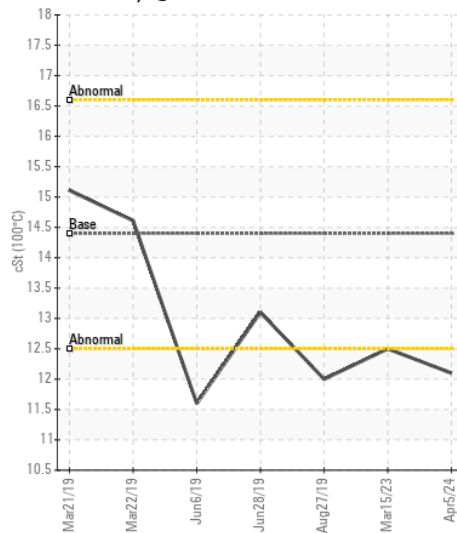
Ferrous Alloys



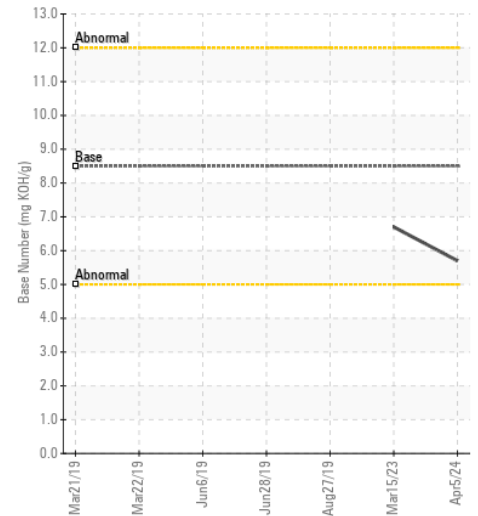
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : LH0258853
Lab Number : 06159743
Unique Number : 10995166
Test Package : CONST (Additional Tests: FuelDilution, PercentFuel, TBN)

Received : 24 Apr 2024
Tested : 29 Apr 2024
Diagnosed : 29 Apr 2024 - Sean Felton

FINKBINER EQUIPMENT CO.
 15 W 400 N FRONTAGE RD
 BURR RIDGE, IL
 US 60527
 Contact: GERARDO SANCHEZ
 gsanchez@amstate.com
 T: (630)450-2316
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To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)