

LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A944CHD 051846-194 - Diesel Engine

Sample No: LH0273216

Oil Type: CONOCO PHILLIPS GUARDOL ECT 15W40



NILES IRON & METAL CO. INC.

P.O. BOX 166

NILES, OH

US 44446

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Sample Information

Sample Number	LH0273216	LH0273209	LH0244849	LH0244859
Sample Date	10 May 2024	06 Mar 2024	09 Jan 2024	28 Nov 2023
Machine Hours	33808	33244	32866	32577
Oil Hours	500	250	250	300
Oil Changed	Changed	Changed	Changed	Changed
Sample Status	SEVERE	NORMAL	NORMAL	NORMAL



Oil Condition

Visc @ 100°C	cSt	19.4	13.4	13.2	13.2
Base Number (BN)	mg KOH/g	0.0	6.5	7.3	7.2
Oxidation (PA)	%	59	53	50	51



Contamination

Water	%	NEG	NEG	NEG	NEG
Soot %	%	5.1	2.9	2.3	2.4
Nitration (PA)	%	93	74	66	69
Sulfation (PA)	%	78	62	59	59
Glycol	%	NEG	NEG	NEG	NEG
Fuel	%	<1.0	<1.0	<1.0	<1.0
Silicon	ppm	6	5	6	6
Sodium	ppm	2	1	2	<1
Potassium	ppm	4	<1	4	2



Wear Metals

Iron	ppm	25	16	12	13
Copper	ppm	4	2	1	<1
Lead	ppm	1	0	<1	0
Tin	ppm	<1	<1	<1	<1
Aluminum	ppm	2	<1	2	1
Chromium	ppm	<1	<1	<1	<1
Molybdenum	ppm	34	36	37	33
Nickel	ppm	<1	0	<1	<1
Titanium	ppm	7	10	7	8
Silver	ppm	0	0	0	0
Manganese	ppm	<1	<1	<1	<1
Vanadium	ppm	<1	0	<1	<1



Additives

Calcium	ppm	1589	1424	1380	1617
Magnesium	ppm	593	596	647	551
Zinc	ppm	1185	1156	1201	1298
Phosphorus	ppm	1033	978	1018	1088
Barium	ppm	0	0	0	0
Boron	ppm	26	31	24	30

Diagnosis

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value. All component wear rates are normal. There is an abnormal amount of solids and carbon present in the oil. The oil viscosity is higher than normal. The BN level is low.

Depot: NILNIL

Unique No: 11050133

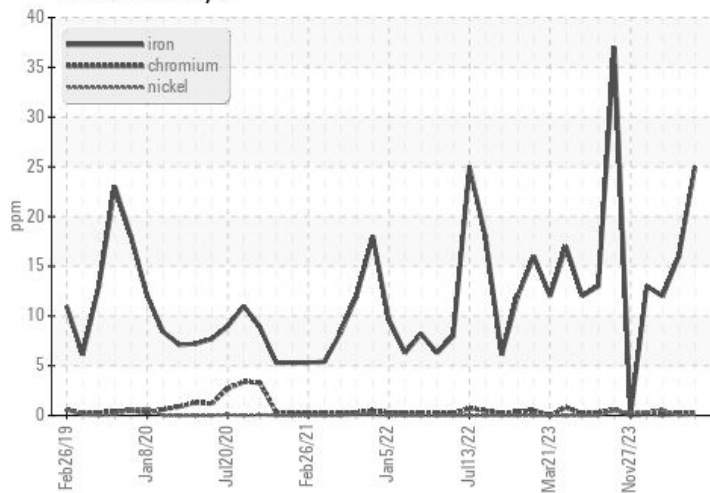
Signed: Jonathan Hester

Report Date: 30 May 2024

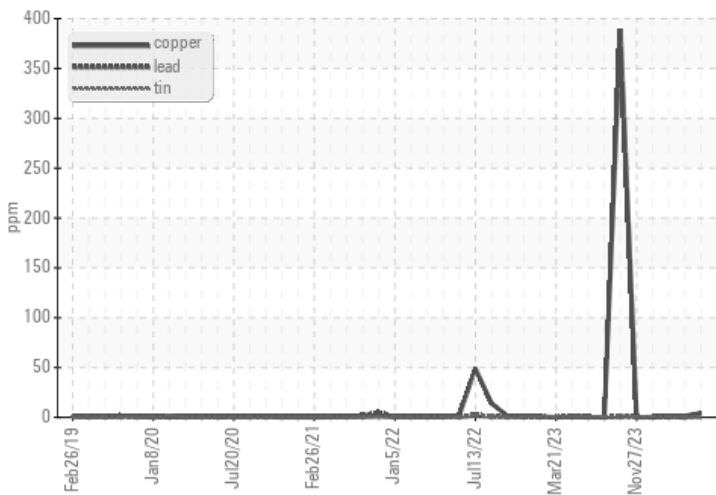


Graphs

Ferrous Alloys



Non-ferrous Metals



● Viscosity @ 100°C



● Base Number

