LIEBHERR
CONSTRUCTION EQUIPMENT

LIEBHERR R930 056356-1716 - Diesel Engine

Sample No: LH0243975

Oil Type: LIEBHERR MOTOROIL 10W-40 LOW ASH

ACECO
10119 RESIDENCY ROAD
MANASSAS, VA
US 20110
Contact: RON BROCK

T: (703)392-0111
F: (703)331-5604

SAMPLE INFORMATION

Sample Number		**LH0243975**	---	---	---
Sample Date		**22 May 2023**	---	---	---
Machine Hours		**475**	---	---	---
Oil Hours		**475**	---	---	---
Oil Changed		**Changed**	---	---	---
Sample Status		**ABNORMAL**	---	---	---

OIL CONDITION

Visc @ 100°C	cSt	**11.9**	---	---	---
Base Number (BN)	mg KOH/g	**5.0**	---	---	---
Oxidation (PA)	%	**200**	---	---	---

CONTAMINATION

Soot %	%	**0.1**	---	---	---
Nitration (PA)	%	**100**	---	---	---
Sulfation (PA)	%	**107**	---	---	---
Glycol	%	**NEG**	---	---	---
Fuel	%	**<1.0**	---	---	---
Silicon	ppm	**13**	---	---	---
Sodium	ppm	**2**	---	---	---
Potassium	ppm	**2**	---	---	---

WEAR METALS

Iron	ppm	**10**	---	---	---
Copper	ppm	**265**	---	---	---
Lead	ppm	**2**	---	---	---
Tin	ppm	**2**	---	---	---
Aluminum	ppm	**4**	---	---	---
Chromium	ppm	**1**	---	---	---
Molybdenum	ppm	**45**	---	---	---
Nickel	ppm	**0**	---	---	---
Titanium	ppm	**<1**	---	---	---
Silver	ppm	**0**	---	---	---
Manganese	ppm	**1**	---	---	---
Vanadium	ppm	**0**	---	---	---

ADDITIVES

Calcium	ppm	**1435**	---	---	---
Magnesium	ppm	**909**	---	---	---
Zinc	ppm	**916**	---	---	---
Phosphorus	ppm	**738**	---	---	---
Barium	ppm	**30**	---	---	---
Boron	ppm	**100**	---	---	---

Diagnosis

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.The copper level is abnormal. In the absence of other significant wear metals, suspect copper due to sources other than wear (i.e. cooling core). All other metal levels are typical for a new component breaking in. 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.

Depot: ACEMAN
Unique No: 10635627
Signed: Jonathan Hester
Report Date: 12 Sep 2023

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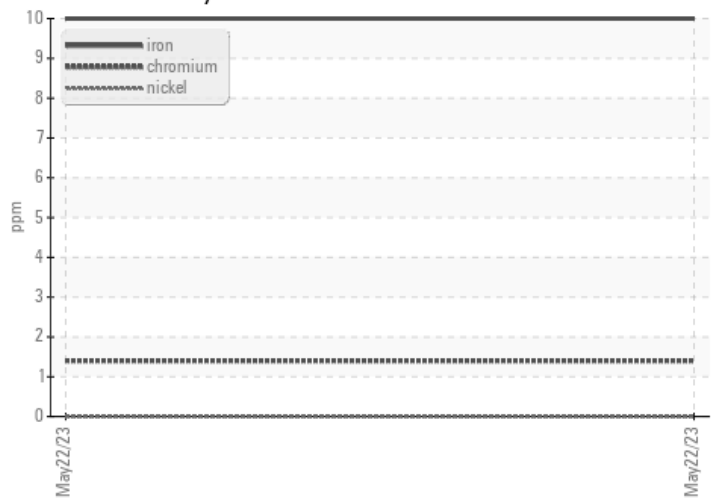
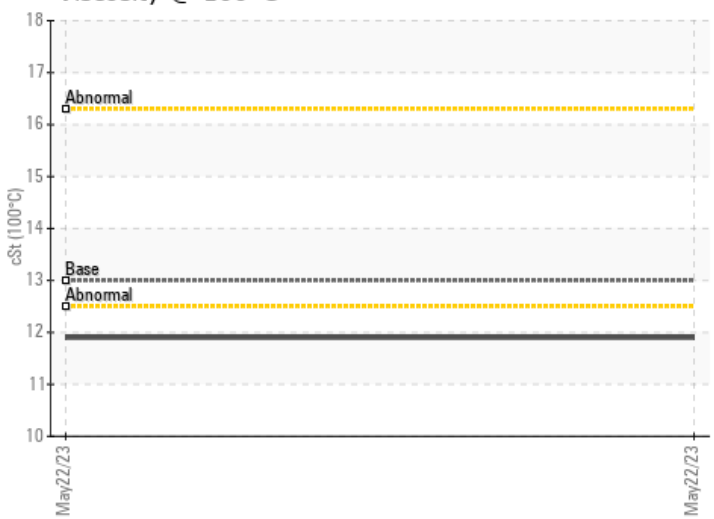
GRAPHS

Ferrous Alloys



Non-ferrous Metals

Viscosity @ 100°C



Base Number