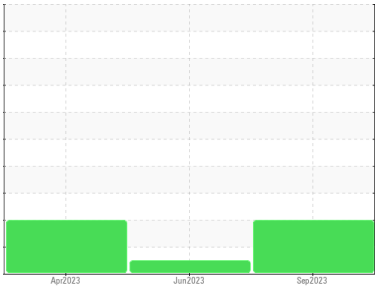
# OIL ANALYSIS REPORT

Sample Rating Trend




ISO

Area
## [CONHER]
Machine Id
## VOLVO 2008 #111 Volvo
Component
**Diesel Engine**
Fluid
**Volvo Mineral 15W40 CI-4 (45 LTR)**

## DIAGNOSIS

**Recommendation**

We recommend you service the filters on this component. Resample at the next service interval to monitor. ( Customer Sample Comment: Volvo Mineral CI-4 plus 15W40 )

**Wear**

All component wear rates are normal.

**Contamination**

There is a high amount of particulates present in the oil.

**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.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **KL0012829** | KL0012385 | KL0012341 |
| Sample Date | | Client Info | | **16 Sep 2023** | 30 Jun 2023 | 19 Apr 2023 |
| Machine Age | kms | Client Info | | **1752857** | 1719576 | 1697117 |
| Oil Age | kms | Client Info | | **57740** | 22459 | 2000 |
| Oil Changed | | Client Info | | **Not Changd** | Not Changd | Not Changd |
| Sample Status | | | | **ABNORMAL** | NORMAL | ABNORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >3.0 | **<1.0** | <1.0 | <1.0 |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >165 | **37** | 16 | 14 |
| Chromium | ppm | ASTM D5185m | >5 | **1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >4 | **0** | 0 | 0 |
| Titanium | ppm | ASTM D5185m | >2 | **<1** | <1 | <1 |
| Silver | ppm | ASTM D5185m | >2 | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | **4** | 2 | 2 |
| Lead | ppm | ASTM D5185m | >150 | **41** | 5 | 0 |
| Copper | ppm | ASTM D5185m | >90 | **2** | 2 | <1 |
| Tin | ppm | ASTM D5185m | >5 | **<1** | <1 | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

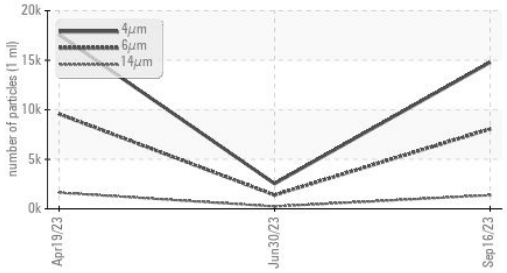
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **13** | 34 | 2 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **9** | 15 | 1 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **72** | 99 | 52 |
| Calcium | ppm | ASTM D5185m | | **3370** | 3656 | 3544 |
| Phosphorus | ppm | ASTM D5185m | | **1034** | 998 | 959 |
| Zinc | ppm | ASTM D5185m | | **1302** | 1234 | 1151 |
| Sulfur | ppm | ASTM D5185m | | **4237** | 5134 | 5006 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >35 | **17** | 24 | 4 |
| Sodium | ppm | ASTM D5185m | | **2** | 1 | 2 |
| Potassium | ppm | ASTM D5185m | >20 | **<1** | 2 | 1 |

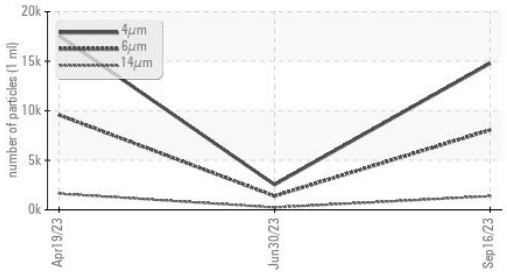
| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >7.5 | **0.9** | 0.7 | 0.5 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **12.1** | 9.3 | 7.1 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **27.5** | 21.9 | 18.4 |

# OIL ANALYSIS REPORT

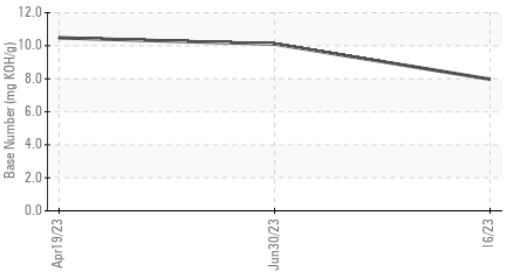
Particle Trend



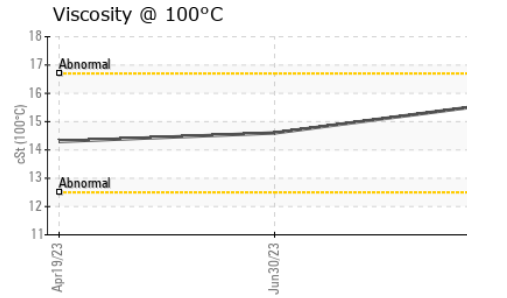

Particle Trend




Base Number




Viscosity @ 100°C




| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | **14781** | 2540 | 17573 |
| Particles >6µm | | ASTM D7647 | >5000 | ▲ **8052** | 1384 | ▲ 9573 |
| Particles >14µm | | ASTM D7647 | >640 | ▲ **1370** | 236 | ▲ 1629 |
| Particles >21µm | | ASTM D7647 | >160 | ▲ **462** | 79 | ▲ 549 |
| Particles >38µm | | ASTM D7647 | >40 | ▲ **71** | 12 | ▲ 85 |
| Particles >71µm | | ASTM D7647 | >10 | **7** | 1 | 9 |
| Oil Cleanliness | | ISO 4406 (c) | >19/16 | ▲ **20/18** | 18/15 | ▲ 20/18 |

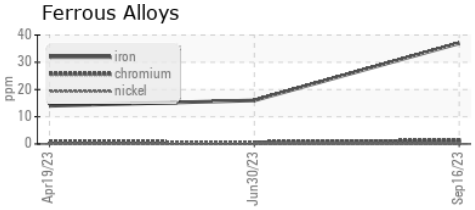
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **21.8** | 15.0 | 11.1 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | | **7.97** | 10.10 | 10.48 |

| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

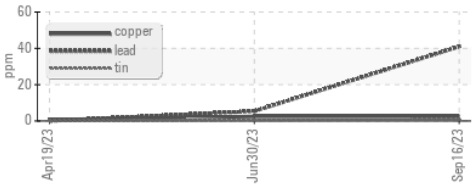
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | | **15.6** | 14.6 | 14.3 |

## GRAPHS

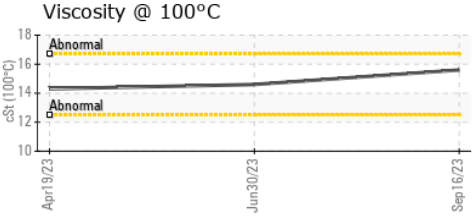
Ferrous Alloys



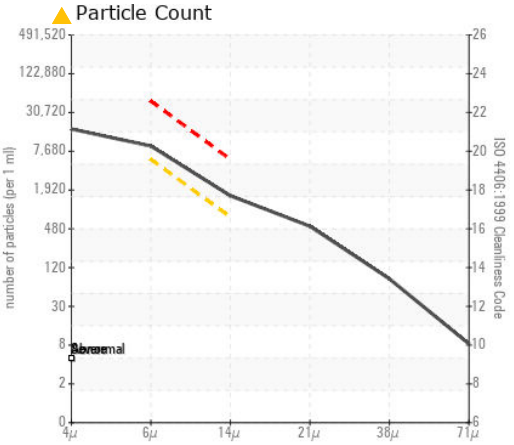

Non-ferrous Metals



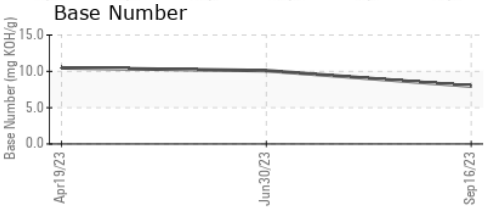

Viscosity @ 100°C




Particle Count




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : KL0012829 **Received** : 29 Sep 2023
**Lab Number** : 05964774 **Diagnosed** : 02 Oct 2023
**Unique Number** : 10671325 **Diagnostician** : Don Baldridge
**Test Package** : MOB 2 ( Additional Tests: PrtCount )

*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)*

**LAMO**

NAVOJOA,
MX
Contact: ANDRES MONROY
andres.monroy@cmoderna.com
T:
F: