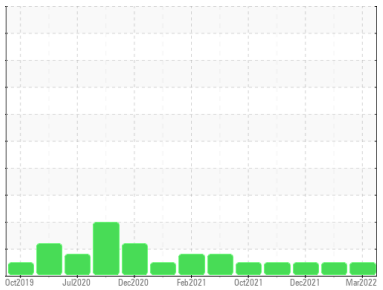
# OIL ANALYSIS REPORT

Sample Rating Trend




NORMAL

Area
**GUAY SON [CONHER]**
Machine Id
**MAIN ENGINE**
Component
**Bottom Diesel Engine**
Fluid
**Xtra Rev SAE 15W40 (160 LTR)**

## DIAGNOSIS

**Recommendation**
Resample at the next service interval to monitor. ( Customer Sample Comment: Add particule count )

**Wear**
All component wear rates are normal.

**Contamination**
There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

**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 | | **KL0009211** | KL0009071 | KL0009005 |
| Sample Date | | Client Info | | **23 Mar 2022** | 08 Feb 2022 | 06 Dec 2021 |
| Machine Age | hrs | Client Info | | **0** | 9827 | 8941 |
| Oil Age | hrs | Client Info | | **0** | 485 | 838 |
| Oil Changed | | Client Info | | **N/A** | Not Changd | Changed |
| Sample Status | | | | **NORMAL** | NORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Fuel | | WC Method | >5 | **<1.0** | <1.0 | <1.0 |
| Water | | WC Method | >0.2 | **NEG** | NEG | NEG |
| Glycol | | WC Method | | **NEG** | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | **15** | 19 | 18 |
| Chromium | ppm | ASTM D5185m | >20 | **<1** | <1 | <1 |
| Nickel | ppm | ASTM D5185m | >4 | **0** | <1 | 0 |
| Titanium | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Silver | ppm | ASTM D5185m | >3 | **<1** | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >20 | **2** | 3 | 1 |
| Lead | ppm | ASTM D5185m | >40 | **2** | 2 | 4 |
| Copper | ppm | ASTM D5185m | >330 | **2** | 2 | 4 |
| Tin | ppm | ASTM D5185m | >15 | **1** | 2 | 1 |
| Antimony | ppm | ASTM D5185m | | **---** | <1 | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

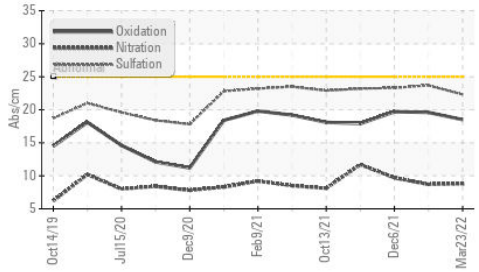
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **271** | 359 | 160 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | **102** | 113 | 119 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **498** | 558 | 536 |
| Calcium | ppm | ASTM D5185m | | **1365** | 1490 | 1459 |
| Phosphorus | ppm | ASTM D5185m | | **816** | 884 | 866 |
| Zinc | ppm | ASTM D5185m | | **913** | 977 | 992 |
| Sulfur | ppm | ASTM D5185m | | **2523** | 2753 | 2439 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | **8** | 11 | 12 |
| Sodium | ppm | ASTM D5185m | | **3** | 5 | 29 |
| Potassium | ppm | ASTM D5185m | >20 | **0** | <1 | 3 |

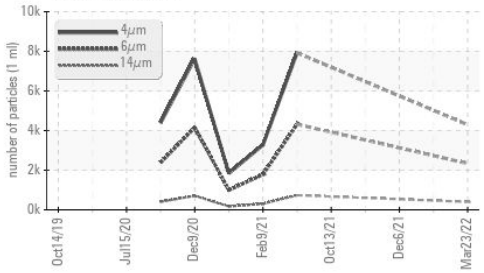
| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | **0.3** | 0.3 | 0.3 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **8.8** | 8.7 | 9.7 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **22.3** | 23.7 | 23.3 |

# OIL ANALYSIS REPORT

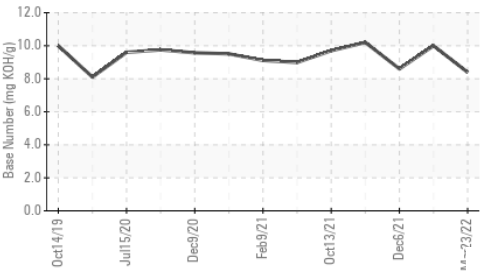
FT-IR (Direct Trend)



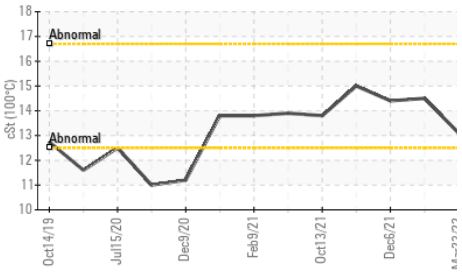

Particle Trend



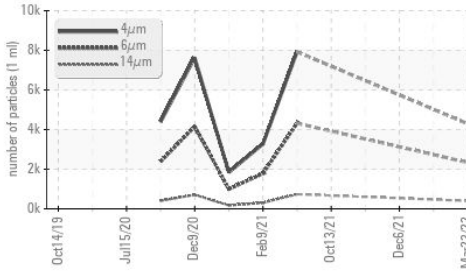

Base Number




Viscosity @ 100°C




Particle Trend




| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | | **4294** | --- | --- |
| Particles >6µm | | ASTM D7647 | >5000 | **2339** | --- | --- |
| Particles >14µm | | ASTM D7647 | >640 | **398** | --- | --- |
| Particles >21µm | | ASTM D7647 | >160 | **134** | --- | --- |
| Particles >38µm | | ASTM D7647 | >40 | **21** | --- | --- |
| Particles >71µm | | ASTM D7647 | >10 | **2** | --- | --- |
| Oil Cleanliness | | ISO 4406 (c) | >19/16 | **18/16** | --- | --- |

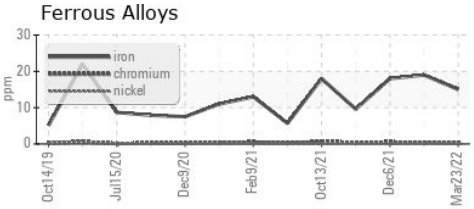
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **18.5** | 19.6 | 19.7 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | | **8.39** | 10.0 | 8.6 |

| 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 |

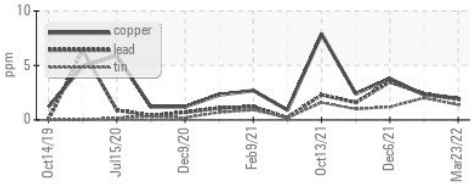
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | | **13.1** | 14.5 | 14.4 |

## GRAPHS

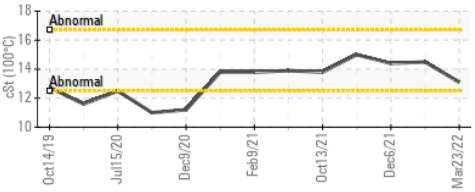
Ferrous Alloys



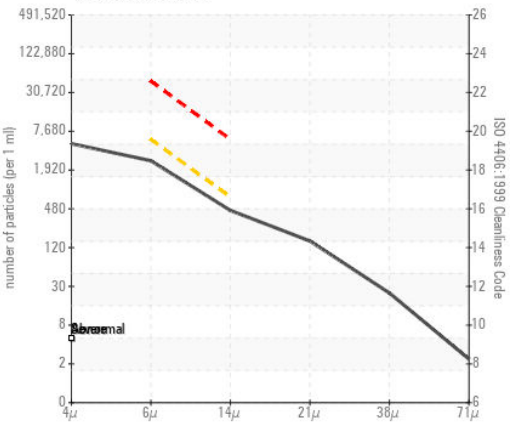

Non-ferrous Metals



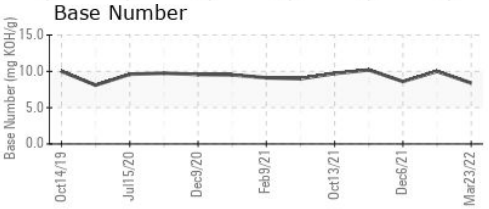

Viscosity @ 100°C




Particle Count




Base Number




**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : KL0009211
**Lab Number** : 05505978
**Unique Number** : 9915252
**Test Package** : FLEET ( Additional Tests: PrtCount )

**Received** : 30 Mar 2022
**Tested** : 31 Mar 2022
**Diagnosed** : 31 Mar 2022 - Doug Bogart

Certificate L2367

*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)*

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Submitted By: EDUARDO GARCIA