



|                 |                  |
|-----------------|------------------|
| WEAR            | <b>ABNORMAL</b>  |
| CONTAMINATION   | <b>NORMAL</b>    |
| FLUID CONDITION | <b>ATTENTION</b> |



Machine Id  
**VOLVO L220H 3480**  
Component  
**Diesel Engine**  
Fluid  
**VOLVO ULTRA DIESEL ENGINE OIL 15W40 VDS-3 (13 GAL)**

**RECOMMENDATION**

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

| Test           | UOM | Method      | Limit/Abn | Current            | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|----------|----------|
| Sample Number  |     | Client Info |           | <b>ML0002115</b>   | ---      | ---      |
| Sample Date    |     | Client Info |           | <b>24 Jun 2024</b> | ---      | ---      |
| Machine Age    | hrs | Client Info |           | <b>528</b>         | ---      | ---      |
| Oil Age        | hrs | Client Info |           | <b>528</b>         | ---      | ---      |
| Filter Age     | hrs | Client Info |           | <b>528</b>         | ---      | ---      |
| Oil Changed    |     | Client Info |           | <b>Changed</b>     | ---      | ---      |
| Filter Changed |     | Client Info |           | <b>Changed</b>     | ---      | ---      |
| Sample Status  |     |             |           | <b>ABNORMAL</b>    | ---      | ---      |

**WEAR**

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.

|              |        |             |      |              |     |     |
|--------------|--------|-------------|------|--------------|-----|-----|
| Iron         | ppm    | ASTM D5185m | >200 | <b>28</b>    | --- | --- |
| Chromium     | ppm    | ASTM D5185m | >20  | <b>&lt;1</b> | --- | --- |
| Nickel       | ppm    | ASTM D5185m | >5   | <b>2</b>     | --- | --- |
| Titanium     | ppm    | ASTM D5185m |      | <b>0</b>     | --- | --- |
| Silver       | ppm    | ASTM D5185m | >2   | <b>&lt;1</b> | --- | --- |
| Aluminum     | ppm    | ASTM D5185m | >30  | <b>4</b>     | --- | --- |
| Lead         | ppm    | ASTM D5185m | >40  | <b>1</b>     | --- | --- |
| Copper       | ppm    | ASTM D5185m | >20  | <b>▲ 130</b> | --- | --- |
| Tin          | ppm    | ASTM D5185m | >20  | <b>2</b>     | --- | --- |
| Vanadium     | ppm    | ASTM D5185m |      | <b>&lt;1</b> | --- | --- |
| White Metal  | scalar | *Visual     | NONE | <b>NONE</b>  | --- | --- |
| Yellow Metal | scalar | *Visual     | NONE | <b>NONE</b>  | --- | --- |

**CONTAMINATION**

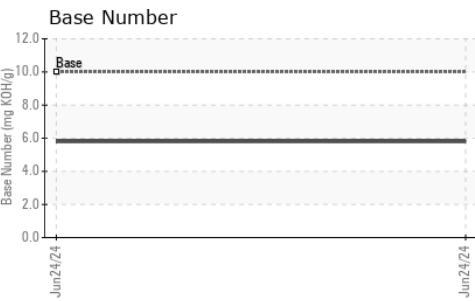
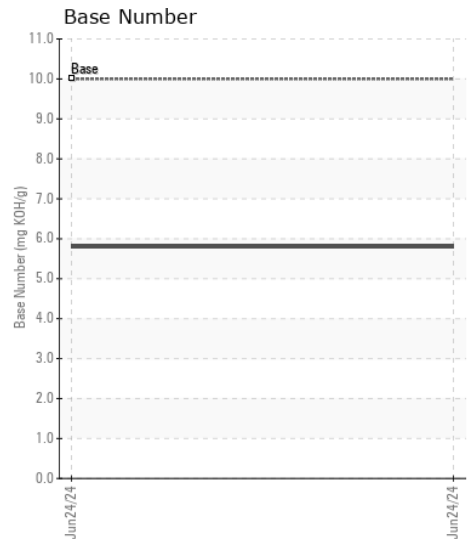
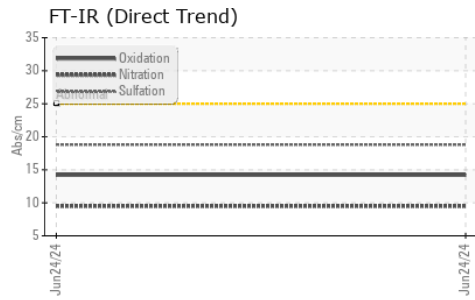
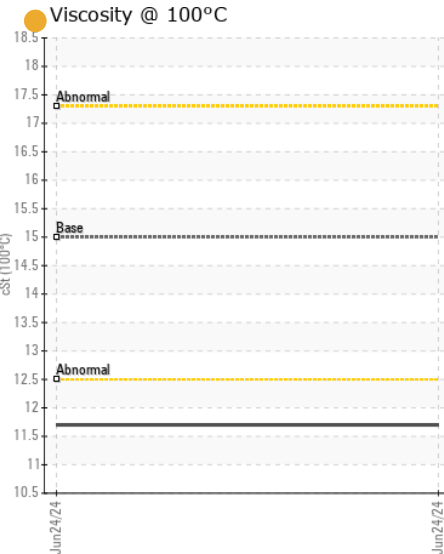
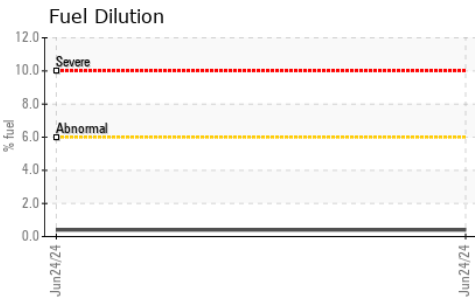
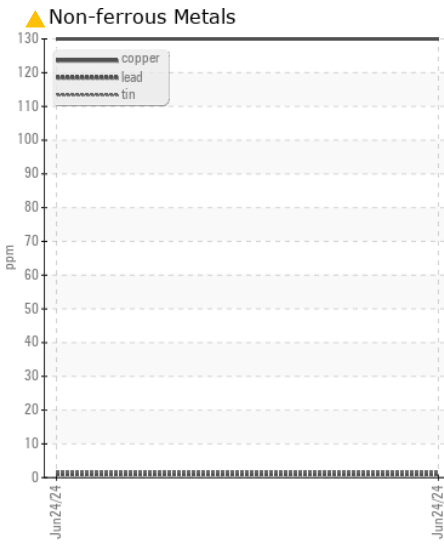
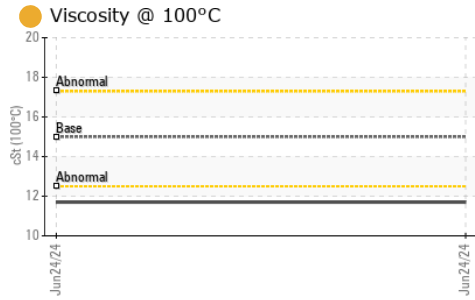
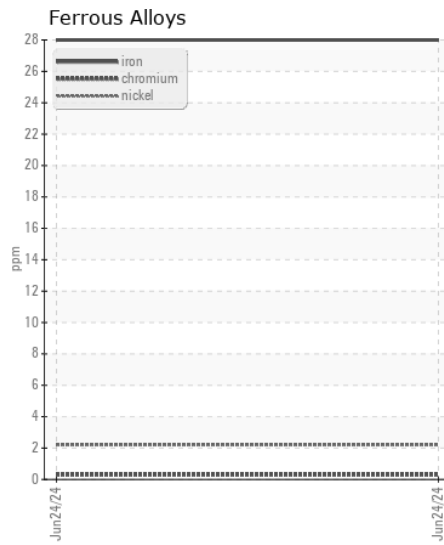
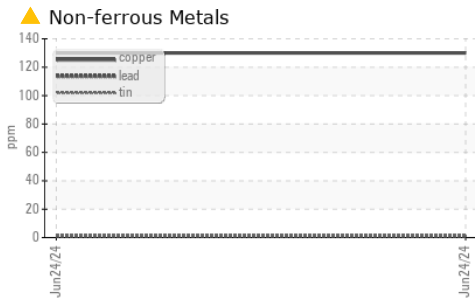
Fuel content negligible. There is no indication of any contamination in the oil.

|                  |          |             |       |              |     |     |
|------------------|----------|-------------|-------|--------------|-----|-----|
| Silicon          | ppm      | ASTM D5185m | >20   | <b>25</b>    | --- | --- |
| Potassium        | ppm      | ASTM D5185m | >20   | <b>7</b>     | --- | --- |
| Fuel             | %        | ASTM D3524  | >6.0  | <b>0.4</b>   | --- | --- |
| Water            |          | WC Method   | >0.2  | <b>NEG</b>   | --- | --- |
| Glycol           |          | WC Method   |       | <b>NEG</b>   | --- | --- |
| Soot %           | %        | *ASTM D7844 | >3    | <b>0.2</b>   | --- | --- |
| Nitration        | Abs/cm   | *ASTM D7624 | >20   | <b>9.5</b>   | --- | --- |
| Sulfation        | Abs/.1mm | *ASTM D7415 | >30   | <b>18.8</b>  | --- | --- |
| Silt             | scalar   | *Visual     | NONE  | <b>NONE</b>  | --- | --- |
| Debris           | scalar   | *Visual     | NONE  | <b>NONE</b>  | --- | --- |
| Sand/Dirt        | scalar   | *Visual     | NONE  | <b>NONE</b>  | --- | --- |
| Appearance       | scalar   | *Visual     | NORML | <b>NORML</b> | --- | --- |
| Odor             | scalar   | *Visual     | NORML | <b>NORML</b> | --- | --- |
| Emulsified Water | scalar   | *Visual     | >0.2  | <b>NEG</b>   | --- | --- |

**FLUID CONDITION**

The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

|                  |          |             |      |               |     |     |
|------------------|----------|-------------|------|---------------|-----|-----|
| Sodium           | ppm      | ASTM D5185m |      | <b>4</b>      | --- | --- |
| Boron            | ppm      | ASTM D5185m | 2.5  | <b>53</b>     | --- | --- |
| Barium           | ppm      | ASTM D5185m | 0.0  | <b>0</b>      | --- | --- |
| Molybdenum       | ppm      | ASTM D5185m | 0.7  | <b>89</b>     | --- | --- |
| Manganese        | ppm      | ASTM D5185m | 0.0  | <b>4</b>      | --- | --- |
| Magnesium        | ppm      | ASTM D5185m | 256  | <b>68</b>     | --- | --- |
| Calcium          | ppm      | ASTM D5185m | 2057 | <b>2320</b>   | --- | --- |
| Phosphorus       | ppm      | ASTM D5185m | 935  | <b>1046</b>   | --- | --- |
| Zinc             | ppm      | ASTM D5185m | 1223 | <b>1298</b>   | --- | --- |
| Sulfur           | ppm      | ASTM D5185m | 4079 | <b>4790</b>   | --- | --- |
| Oxidation        | Abs/.1mm | *ASTM D7414 | >25  | <b>14.2</b>   | --- | --- |
| Base Number (BN) | mg KOH/g | ASTM D2896  | 10   | <b>5.8</b>    | --- | --- |
| Visc @ 100°C     | cSt      | ASTM D445   | 15.0 | <b>● 11.7</b> | --- | --- |



Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : ML0002115 **Received** : 27 Jun 2024  
**Lab Number** : 06223034 **Tested** : 02 Jul 2024  
**Unique Number** : 11101231 **Diagnosed** : 02 Jul 2024 - Don Baldrige  
**Test Package** : CONST ( Additional Tests: FuelDilution, PercentFuel, TBN )

**SAVAGE STONE-A DIV OF LAUREL SAND & GRAVEL**  
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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)