



# OIL ANALYSIS REPORT

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

Machine Id  
**VOLVO 110087**  
Component  
**Diesel Engine**  
Fluid  
**DIESEL ENGINE OIL SAE 15W40 (--- GAL)**

## RECOMMENDATION

Resample at the next service interval to monitor.

| Test           | UOM | Method      | Limit/Abn | Current            | History1    | History2    |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number  |     | Client Info |           | <b>KLMFA13331</b>  | KLMFA13344  | KLMFA13354  |
| Sample Date    |     | Client Info |           | <b>12 Jan 2015</b> | 01 Dec 2014 | 03 Dec 2013 |
| Machine Age    | mls | Client Info |           | <b>2486034</b>     | 2461375     | 2370834     |
| Oil Age        | mls | Client Info |           | <b>115200</b>      | 90541       | 61678       |
| Filter Age     | mls | Client Info |           | <b>19541</b>       | 12353       | 61678       |
| Oil Changed    |     | Client Info |           | <b>Not Changd</b>  | Not Changd  | Changed     |
| Filter Changed |     | Client Info |           | <b>Changed</b>     | Not Changd  | Changed     |
| Sample Status  |     |             |           | <b>NORMAL</b>      | NORMAL      | NORMAL      |

## WEAR

All component wear rates are normal.

|              |        |             |      |              |      |      |
|--------------|--------|-------------|------|--------------|------|------|
| Iron         | ppm    | ASTM D5185m | >100 | <b>76</b>    | 50   | 85   |
| Chromium     | ppm    | ASTM D5185m | >20  | <b>&lt;1</b> | <1   | 2    |
| Nickel       | ppm    | ASTM D5185m | >2   | <b>1</b>     | <1   | 2    |
| Titanium     | ppm    | ASTM D5185m |      | <b>0</b>     | <1   | 0    |
| Silver       | ppm    | ASTM D5185m | >2   | <b>0</b>     | 0    | 0    |
| Aluminum     | ppm    | ASTM D5185m | >25  | <b>4</b>     | 5    | 7    |
| Lead         | ppm    | ASTM D5185m | >40  | <b>16</b>    | 5    | 7    |
| Copper       | ppm    | ASTM D5185m | >330 | <b>33</b>    | 21   | 27   |
| Tin          | ppm    | ASTM D5185m | >15  | <b>3</b>     | 0    | 1    |
| Vanadium     | ppm    | ASTM D5185m |      | <b>0</b>     | 0    | <1   |
| White Metal  | scalar | *Visual     | NONE | <b>NONE</b>  | NONE | NONE |
| Yellow Metal | scalar | *Visual     | NONE | <b>NONE</b>  | NONE | NONE |

## CONTAMINATION

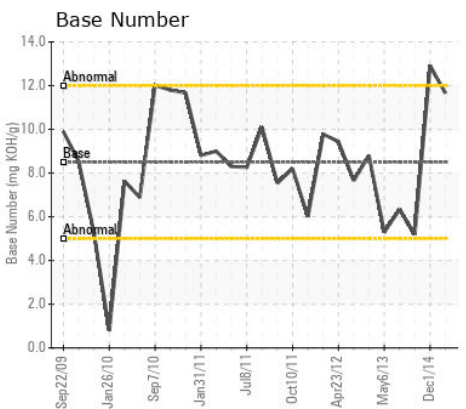
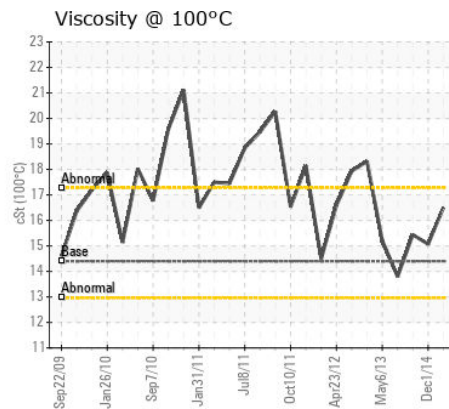
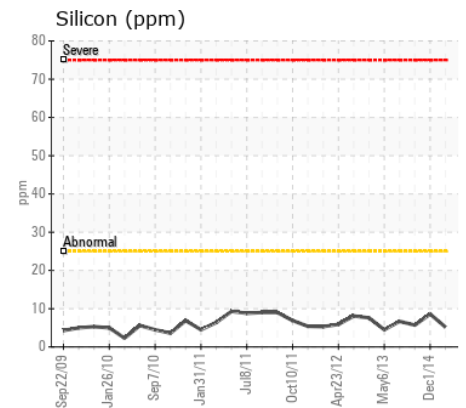
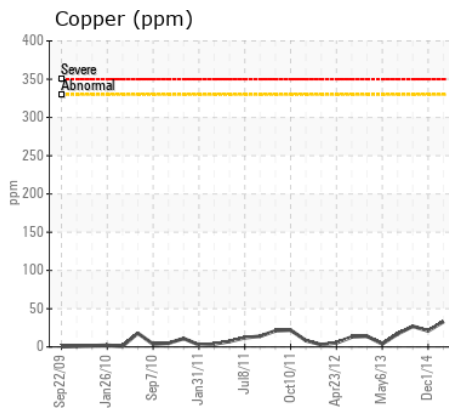
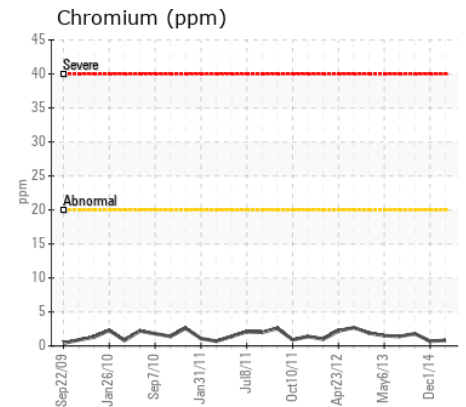
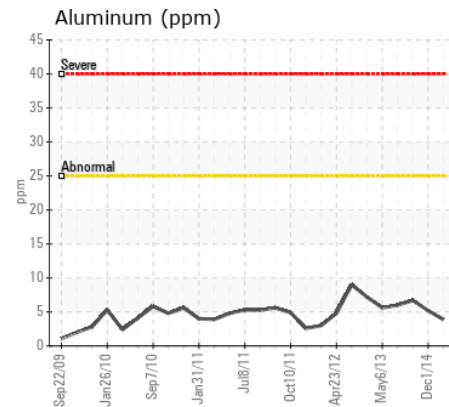
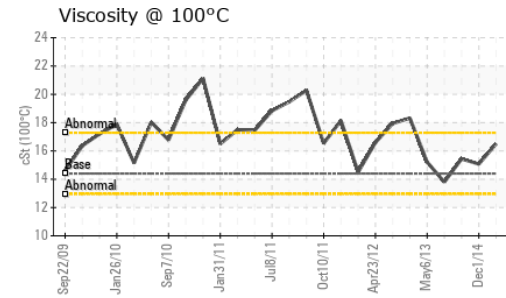
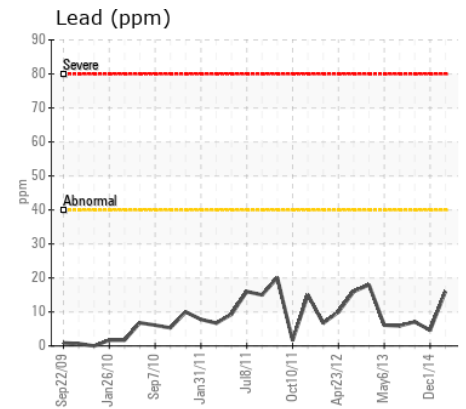
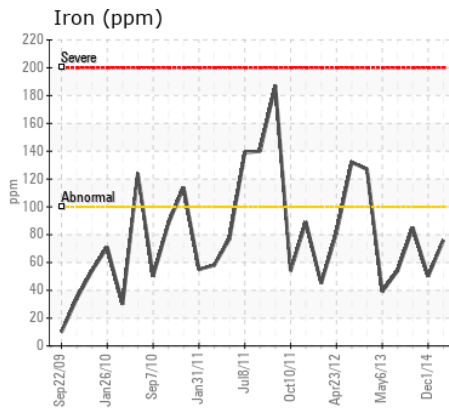
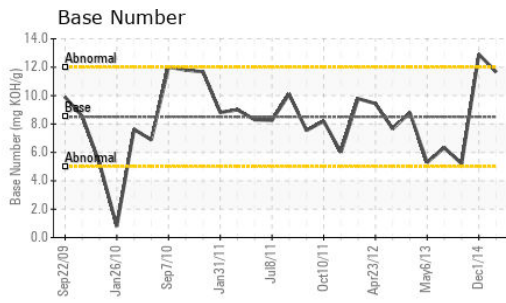
There is no indication of any contamination in the component.

|                  |          |             |       |                |       |       |
|------------------|----------|-------------|-------|----------------|-------|-------|
| Silicon          | ppm      | ASTM D5185m | >25   | <b>5</b>       | 9     | 6     |
| Potassium        | ppm      | ASTM D5185m | >20   | <b>4</b>       | 0     | 0     |
| Fuel             |          | WC Method   | >6.0  | <b>&lt;1.0</b> | <1.0  | <1.0  |
| Water            |          | WC Method   | >0.2  | <b>NEG</b>     | NEG   | NEG   |
| Glycol           |          | WC Method   |       | <b>NEG</b>     | NEG   | NEG   |
| Soot %           | %        | *ASTM D7844 | >3    | <b>0.1</b>     | 0.1   | 2.2   |
| Nitration        | Abs/cm   | *ASTM D7624 |       | <b>3.</b>      | 4.    | 11.   |
| Sulfation        | Abs/.1mm | *ASTM D7415 |       | <b>12.</b>     | 14.   | 29.   |
| Silt             | scalar   | *Visual     | NONE  | <b>NONE</b>    | NONE  | NONE  |
| Debris           | scalar   | *Visual     | NONE  | <b>NONE</b>    | NONE  | NONE  |
| Sand/Dirt        | scalar   | *Visual     | NONE  | <b>NONE</b>    | NONE  | NONE  |
| Appearance       | scalar   | *Visual     | NORML | <b>NORML</b>   | NORML | NORML |
| Odor             | scalar   | *Visual     | NORML | <b>NORML</b>   | NORML | NORML |
| Emulsified Water | scalar   | *Visual     | >0.2  | <b>NEG</b>     | NEG   | NEG   |

## 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.

|                  |          |             |      |              |       |       |
|------------------|----------|-------------|------|--------------|-------|-------|
| Sodium           | ppm      | ASTM D5185m |      | <b>32</b>    | 40    | 45    |
| Boron            | ppm      | ASTM D5185m | 250  | <b>107</b>   | 103   | 52    |
| Barium           | ppm      | ASTM D5185m | 10   | <b>0</b>     | 0     | 0     |
| Molybdenum       | ppm      | ASTM D5185m | 100  | <b>108</b>   | 96    | 93    |
| Manganese        | ppm      | ASTM D5185m |      | <b>2</b>     | <1    | <1    |
| Magnesium        | ppm      | ASTM D5185m | 450  | <b>480</b>   | 450   | 355   |
| Calcium          | ppm      | ASTM D5185m | 3000 | <b>2092</b>  | 1920  | 1775  |
| Phosphorus       | ppm      | ASTM D5185m | 1150 | <b>1206</b>  | 1167  | 1077  |
| Zinc             | ppm      | ASTM D5185m | 1350 | <b>1390</b>  | 1422  | 1322  |
| Sulfur           | ppm      | ASTM D5185m | 4250 | <b>2482</b>  | 3735  | 1836  |
| Oxidation        | Abs/.1mm | *ASTM D7414 |      | <b>6.</b>    | 7.    | 25.   |
| Base Number (BN) | mg KOH/g | ASTM D2896  | 8.5  | <b>11.66</b> | 12.91 | 5.20  |
| Visc @ 100°C     | cSt      | ASTM D445   | 14.4 | <b>16.5</b>  | 15.07 | 15.44 |



**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : KLMFA13331 **Received** : 19 Jan 2015  
**Lab Number** : 03666104 **Diagnosed** : 20 Jan 2015  
**Unique Number** : 6884091 **Diagnostician** : Don Baldrige  
**Test Package** : MOB 2

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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)