

# **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id **45002** Component **Diesel Engine** Fluid **KENDALL 15W40 (--- QTS)** 

#### DIAGNOSIS

# Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

# Wear

All component wear rates are normal.

### Contamination

There is no indication of any contamination 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 INFORM  | 1ATION  | method   | limit/base  | current   | history1  | history2  |  |
|--|---|--|---|---|---|---|--|
| Sample Number  |   | Client Info  |   | WC0867773   |   |   |  |
| Sample Date  |   | Client Info  |   | 12 Apr 2024   |   |   |  |
| Machine Age  | hrs   | Client Info  |   | 4003  |   |   |  |
| Oil Age  | hrs   | Client Info  |   | 430   |   |   |  |
| Oil Changed  |   | Client Info  |   | Changed   |   |   |  |
| Sample Status  |   |  |   | NORMAL  |   |   |  |
| CONTAMINATION  | ١   | method   | limit/base  | current   | history1  | history2  |  |
| Fuel   |   | WC Method  | >5  | <1.0  |   |   |  |
| Water  |   | WC Method  | >0.2  | NEG   |   |   |  |
| Glycol   |   | WC Method  |   | NEG   |   |   |  |
| WEAR METALS  |   | method   | limit/base  | current   | history1  | history2  |  |
| Iron   | ppm   | ASTM D5185m  | >100  | 8   |   |   |  |
| Chromium   | ppm   | ASTM D5185m  | >20   | 1   |   |   |  |
| Nickel   | ppm   | ASTM D5185m  | >4  | 1   |   |   |  |
| Titanium   | ppm   | ASTM D5185m  |   | 87  |   |   |  |
| Silver   | ppm   | ASTM D5185m  | >3  | 0   |   |   |  |
| Aluminum   | ppm   | ASTM D5185m  | >20   | 2   |   |   |  |
| Lead   | ppm   | ASTM D5185m  | >40   | 2   |   |   |  |
| Copper   | ppm   | ASTM D5185m  | >330  | 3   |   |   |  |
| Tin  | ppm   | ASTM D5185m  | >15   | 2   |   |   |  |
| Vanadium   | ppm   | ASTM D5185m  |   | 1   |   |   |  |
| O a alvasiu una  |   | LOTUDEVAL  |   |   |   |   |  |
| Cadmium  | ppm   | ASTM D5185m  |   | 1   |   |   |  |
| ADDITIVES  | ppm   | ASTM D5185m<br>method  | limit/base  | 1<br>current  | <br>history1  | history2  |  |
|  | ppm<br>ppm  |  | limit/base<br>6.3   |   |   |   |  |
| ADDITIVES  |   | method   |   | current   | history1  | history2  |  |
| ADDITIVES<br>Boron   | ppm   | method<br>ASTM D5185m  | 6.3   | current<br>182  | history1  | history2  |  |
| ADDITIVES<br>Boron<br>Barium   | ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m   | 6.3<br>0.6  | current<br>182<br>0   | history1<br>  | history2<br>  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum   | ppm<br>ppm<br>ppm   | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 6.3<br>0.6  | current<br>182<br>0<br>8  | history1<br><br>  | history2<br><br>  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese  | ppm<br>ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 6.3<br>0.6<br>0.4   | current<br>182<br>0<br>8<br>1   | history1<br><br><br>  | history2<br><br><br>  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm   | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 6.3<br>0.6<br>0.4<br>277  | current<br>182<br>0<br>8<br>1<br>408  | history1  | history2<br><br><br>  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514  | current           182           0           8           1           408           1752  | history1  | history2  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm   | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634   | Current<br>182<br>0<br>8<br>1<br>408<br>1752<br>1116  | history1  | history2  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743  | current           182           0           8           1           408           1752           1116           1201  | history1  | history2  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743<br>2592  | Current<br>182<br>0<br>8<br>1<br>408<br>1752<br>1116<br>1201<br>4724  | history1  | history2  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 6.3<br>0.6<br>0.4<br>2777<br>1514<br>634<br>743<br>2592<br><b>limit/base</b>  | current         182         0         8         1         408         1752         1116         1201         4724         current   | history1 history1   | history2 history2   |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon   | ppm   | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 6.3<br>0.6<br>0.4<br>2777<br>1514<br>634<br>743<br>2592<br><b>limit/base</b>  | current         182         0         8         1         408         1752         1116         1201         4724         current         8   | history1 history1   | history2 history2   |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                                   | method           ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743<br>2592<br><b>limit/base</b><br>>25  | current         182         0         8         1         408         1752         1116         1201         4724         current         8         4   | history1  | history2  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                                   | method           ASTM D5185m   | 6.3<br>0.6<br>0.4<br>2777<br>1514<br>634<br>743<br>2592<br>limit/base<br>>25<br>>20   | current         182         0         8         1         408         1752         1116         1201         4724         current         8         4   | history1  | history2 history2   |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED                                     | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                                   | method           ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743<br>2592<br><b>limit/base</b><br>>25<br>>20   | current         182         0         8         1         408         1752         1116         1201         4724         current         8         4         4         current                       | history1  | history2                           history2                           history2   history2 |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %                           | ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm  <br>ppm | method           ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743<br>2592<br>limit/base<br>>25<br>>20<br>limit/base<br>>20   | current         182         0         8         1         408         1752         1116         1201         4724         current         8         4         2         0urrent         0         0.2 | history1 history1 history1 history1   | history2                        history2            history2            history2            history2            history2                     history2                   |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration              | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                            | method           ASTM D5185m   | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743<br>2592<br><i>limit/base</i><br>>25<br>>20<br><i>limit/base</i><br>>3<br>>20                         | current         182         0         8         1         408         1752         1116         1201         4724         current         8         4         current         0.2         5.9         | history1                        history1            history1            history1               history1 | history2   history2               history2  |  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                            | method           ASTM D5185m           ASTM D5185m | 6.3<br>0.6<br>0.4<br>277<br>1514<br>634<br>743<br>2592<br><b>Imit/base</b><br>>25<br>20<br><b>Imit/base</b><br>>20<br><b>Imit/base</b><br>>3<br>>20 | current         182         0         8         1         408         1752         1116         1201         4724         current         8         4         0.2         5.9         19.3            | history1                           history1            history1                  history1               | history2  history2            history2  |  |



# **OIL ANALYSIS REPORT**

| FT-IR (Direct Trend)   |   | VISUAL                  |                         | method   | limit/base   | current             | history1 | history2  |
|--|---|-------------------------|-------------------------|--|--|---------------------|----------|---|
| 30 - Oxidation   |   | White Metal             | scalar                  | *Visual  | NONE   | NONE                |          |   |
| 25 - Sulfation   |   | Yellow Metal            | scalar                  | *Visual  | NONE   | NONE                |          |   |
| B <sub>20</sub> -  |   | Precipitate             | scalar                  | *Visual  | NONE   | NONE                |          |   |
| 82<br>15   |   | Silt                    | scalar                  | *Visual  | NONE   | NONE                |          |   |
|  |   | Debris                  | scalar                  | *Visual  | NONE   | NONE                |          |   |
| 10+  |   | Sand/Dirt               | scalar                  | *Visual  | NONE   | NONE                |          |   |
| 74   | /24   | Appearance              | scalar                  | *Visual  | NORML  | NORML               |          |   |
| April 2/24   | Apr12/24  | Odor                    | scalar                  | *Visual  | NORML  | NORML               |          |   |
|  |   | Emulsified Water        | scalar                  | *Visual  | >0.2   | NEG                 |          |   |
| Base Number  |   | Free Water              | scalar                  | *Visual  | 20.2   | NEG                 |          |   |
|  |   | FLUID PROPER            |                         | method   | limit/base   | current             | history1 | history2  |
| (0 8.0<br>HOX<br>Bu 6.0  |   | Visc @ 100°C            | cSt                     | ASTM D445  |  | 14.0                |          |   |
| ) and 4.0 -  |   | GRAPHS                  |                         |  |  |                     |          |   |
| 2.0-   |   |                         |                         |  |  |                     |          |   |
|  |   | Ferrous Alloys          |                         |  |  |                     |          |   |
| 0.0 42   | 10  | iron                    |                         |  |  |                     |          |   |
| Apr12/24   | C Land  | 8 - nickel              |                         |  |  |                     |          |   |
|  |   | 6 -                     |                         |  |  |                     |          |   |
| Viscosity @ 100°C  |   |                         |                         |  |  |                     |          |   |
| 17 Abaamad   |   | 4                       |                         |  |  |                     |          |   |
| _16  |   | 2                       |                         |  |  |                     |          |   |
| G 15<br>G 14   |   | 0                       |                         |  |  |                     |          |   |
|  |   |                         |                         |  | 2/24   |                     |          |   |
| 13 Abnormal  |   | Apr12/24                |                         |  | Apr12/24   |                     |          |   |
| 11   |   | Non-ferrous Meta        | ls                      |  |  |                     |          |   |
| Apr12/24   | V Cr C E  | 10 copper               |                         |  |  |                     |          |   |
| Apri   | V   | 8 -                     |                         |  |  |                     |          |   |
|  |   | ensesses tin            |                         |  |  |                     |          |   |
|  | E   | 6                       |                         |  |  |                     |          |   |
|  | ad  | 4                       |                         |  |  |                     |          |   |
|  |   |                         |                         |  |  |                     |          |   |
|  |   | 2 -                     |                         |  |  |                     |          |   |
|  |   | 0                       |                         |  |  |                     |          |   |
|  |   | 12/24                   |                         |  | pr12/24  |                     |          |   |
|  |   | Apr                     |                         |  | Apr  |                     |          |   |
|  |   | Viscosity @ 100°C       |                         |  | Base Number  |                     |          |   |
|  |   |                         |                         |  | 10.0   | T                   |          |   |
|  |   | Abnormal                |                         |  | - 8.0  |                     |          |   |
|  | _   | 16                      |                         |  | (6, 8, 0<br>(6, 0)<br>(6, 0)<br>(6, 0)<br>(6, 0)<br>(6, 0)<br>(6, 0)<br>(6, 0)<br>(7, 0) |                     |          |   |
|  | cSt (100°C)                                       | 15-                     |                         |  | E 6.0  |                     |          |   |
|  | 1   | 314-                    |                         |  | 4.0  |                     |          |   |
|  |   | 13 - Abnormal           |                         |  | 3ase N   |                     |          |   |
|  |   | 12-                     |                         |  | <sup>2</sup> 2.0   |                     |          |   |
|  |   | 11                      |                         |  | 0.0  |                     |          |   |
|  |   | Apr12/24                |                         |  | Apr12/24   | Apr12/24            |          | Apr12/24  |
|  |   | Ap                      |                         |  | Ap   | Ap                  |          | Ap  |
| Unique N<br>Certificate L2367 Test Pac<br>To discuss this sample i | No. :<br>mber :<br>umber :<br>kage :<br>report, c | ontact Customer Serv    | Recei<br>Teste<br>Diagr | ived : 17<br>ed : 18<br>nosed : 18<br>800-237-1368 | 7 Apr 2024<br>3 Apr 2024<br>3 Apr 2024 - W<br>9.   | 860 WES<br>es Davis |          | DHNSON HWY<br>ENEVILLE, TN<br>US 37745<br>Contact: SHOP |
| * - Denotes test method  |   |                         |                         |  |  |                     | .0010)   | T:  |
| Statements of conformit  | y to spe  | cifications are based o | on the sin              | nple accepta                                       | nce decision   | rule (JCGM 106      | :2012)   | F:  |

Report Id: GREGRETN [WUSCAR] 06152566 (Generated: 04/18/2024 17:46:27) Rev: 1

Contact/Location: SHOP ? - GREGRETN

Page 2 of 2