

# **OIL ANALYSIS REPORT**

# Sample Rating Trend

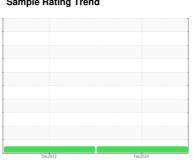
# **NORMAL**



# FREIGHTLINER 422073-SW4222

Component **Diesel Engine** 

**MOBIL DELVAC ELITE 15W40 (--- GAL)** 





# DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the

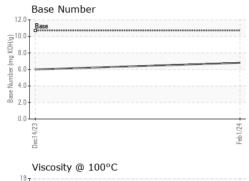
# **Fluid Condition**

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| Sample Number  | 15W40 ( GAL      | .)       |             | Dec2023    | Feb2024     |             |          |
|--|------------------|----------|-------------|------------|-------------|-------------|----------|
| Sample Date  | SAMPLE INFOR     | MATION   | method      | limit/base | current     | history1    | history2 |
| Sample Date  | Sample Number    |          | Client Info |            | GFL0095455  | GFL0095490  |          |
| Machine Age         hrs         Client Info         5231         4942            Oil Age         hrs         Client Info         500         500            Oil Changed         Client Info         Changed Changed          Changed Changed            Sample Status         worm         Imit Michael         NCRMAL             CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >5         <1.0   |                  |          | Client Info |            | 01 Feb 2024 | 14 Dec 2023 |          |
| Oil Age         hrs         Client Info         500         500  | •                | hrs      | Client Info |            | 5231        | 4942        |          |
| Oil Changed Sample Status         Client Info         Changed NORMAL         Changed NORMAL  |                  | hrs      | Client Info |            | 500         | 500         |          |
| NORMAL   |                  |          | Client Info |            | Changed     | Changed     |          |
| Fuel   WC Method   S5   <1.0   <1.0  | -                |          |             |            | _           | NORMAL      |          |
| Water         WC Method         >0.2         NEG         NEG            Glycol         WC Method         NEG         NEG            WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >80         4         5            Chromium         ppm         ASTM D5185m         >5         <1   | CONTAMINAT       | ION      | method      | limit/base | current     | history1    | history2 |
| WEAR METALS  | Fuel             |          | WC Method   | >5         | <1.0        | <1.0        |          |
| WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >80         4         5            Chromium         ppm         ASTM D5185m         >5         <1   | Water            |          | WC Method   | >0.2       | NEG         | NEG         |          |
| Iron   | Glycol           |          | WC Method   |            | NEG         | NEG         |          |
| Chromium   | WEAR METAL       | S        | method      | limit/base | current     | history1    | history2 |
| Nickel   | Iron             | ppm      | ASTM D5185m | >80        | 4           | 5           |          |
| Titanium   | Chromium         | ppm      | ASTM D5185m | >5         | <1          | <1          |          |
| Silver   | Nickel           | ppm      | ASTM D5185m | >2         | 0           | 0           |          |
| Aluminum   | Titanium         | ppm      | ASTM D5185m |            | <1          | 0           |          |
| Lead   | Silver           | ppm      | ASTM D5185m | >3         | 0           | 0           |          |
| Copper         ppm         ASTM D5185m         >150         8         11   | Aluminum         | ppm      | ASTM D5185m | >30        | 6           | 6           |          |
| Tin         ppm         ASTM D5185m         >5         <1         1            Vanadium         ppm         ASTM D5185m         0         0            Cadmium         ppm         ASTM D5185m         0         0            ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         104         71            Barium         ppm         ASTM D5185m         <1         0            Molybdenum         ppm         ASTM D5185m         <1         0            Molybdenum         ppm         ASTM D5185m         <1         0            Molybdenum         ppm         ASTM D5185m         <1         0            Magnesium         ppm         ASTM D5185m         633         631            Magnesium         ppm         ASTM D5185m         1158         1156            Phosphorus         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         >20         3   | Lead             | ppm      | ASTM D5185m | >30        | <1          | <1          |          |
| Vanadium         ppm         ASTM D5185m         0         0            Cadmium         ppm         ASTM D5185m         0         0            ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         104         71            Barium         ppm         ASTM D5185m         119         110            Molybdenum         ppm         ASTM D5185m         119         110            Magnesium         ppm         ASTM D5185m         633         631            Magnesium         ppm         ASTM D5185m         633         631            Calcium         ppm         ASTM D5185m         1158         1156            Phosphorus         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3<  | Copper           | ppm      | ASTM D5185m | >150       | 8           | 11          |          |
| Cadmium         ppm         ASTM D5185m         0         0            ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         104         71            Barium         ppm         ASTM D5185m         <1   | Tin              | ppm      | ASTM D5185m | >5         | <1          | 1           |          |
| ADDITIVES  | Vanadium         | ppm      | ASTM D5185m |            | 0           | 0           |          |
| Boron   ppm   ASTM D5185m   104   71   | Cadmium          | ppm      | ASTM D5185m |            | 0           | 0           |          |
| Barium         ppm         ASTM D5185m         <1         0            Molybdenum         ppm         ASTM D5185m         119         110            Manganese         ppm         ASTM D5185m         <1  | ADDITIVES        |          | method      | limit/base | current     | history1    | history2 |
| Molybdenum         ppm         ASTM D5185m         119         110            Manganese         ppm         ASTM D5185m         <1   | Boron            | ppm      | ASTM D5185m |            | 104         | 71          |          |
| Manganese         ppm         ASTM D5185m         <1         0            Magnesium         ppm         ASTM D5185m         633         631            Calcium         ppm         ASTM D5185m         1158         1156            Phosphorus         ppm         ASTM D5185m         686         678            Zinc         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         >20         3         2            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Sulfation   | Barium           | ppm      | ASTM D5185m |            | <1          | 0           |          |
| Magnesium         ppm         ASTM D5185m         633         631            Calcium         ppm         ASTM D5185m         1158         1156            Phosphorus         ppm         ASTM D5185m         686         678            Zinc         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         >20         3         2            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1   | Molybdenum       | ppm      | ASTM D5185m |            | 119         | 110         |          |
| Calcium         ppm         ASTM D5185m         1158         1156            Phosphorus         ppm         ASTM D5185m         686         678            Zinc         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         >20         3         2            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         8.6         9.1            Nitration         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2                   | Manganese        | ppm      | ASTM D5185m |            | <1          | 0           |          |
| Phosphorus         ppm         ASTM D5185m         686         678            Zinc         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         >20         10         8            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         8.6         9.1            Nitration         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5             | Magnesium        | ppm      | ASTM D5185m |            | 633         | 631         |          |
| Zinc         ppm         ASTM D5185m         772         754            Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         >20         10         8            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/.mm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14. | Calcium          | ppm      | ASTM D5185m |            | 1158        | 1156        |          |
| Sulfur         ppm         ASTM D5185m         2932         2877            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         >20         10         8            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3   | Phosphorus       | ppm      | ASTM D5185m |            | 686         | 678         |          |
| CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         3         2            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3  | Zinc             | ppm      | ASTM D5185m |            | 772         | 754         |          |
| Silicon         ppm         ASTM D5185m         >20         3         2            Sodium         ppm         ASTM D5185m         3         2            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3   | Sulfur           | ppm      | ASTM D5185m |            | 2932        | 2877        |          |
| Sodium         ppm         ASTM D5185m         3         2            Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3  | CONTAMINAN       | TS       | method      | limit/base | current     | history1    | history2 |
| Potassium         ppm         ASTM D5185m         >20         10         8            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3  | Silicon          | ppm      | ASTM D5185m | >20        | 3           | 2           |          |
| INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3  | Sodium           | ppm      | ASTM D5185m |            | 3           | 2           |          |
| Soot %         %         *ASTM D7844         >3         0.2         0.2            Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3  | Potassium        | ppm      | ASTM D5185m | >20        | 10          | 8           |          |
| Nitration         Abs/cm         *ASTM D7624         >20         8.6         9.1            Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3   | INFRA-RED        |          | method      | limit/base | current     | history1    | history2 |
| Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.5         15.3   | Soot %           | %        | *ASTM D7844 | >3         | 0.2         | 0.2         |          |
| FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 14.5 15.3  | Nitration        | Abs/cm   | *ASTM D7624 | >20        | 8.6         | 9.1         |          |
| Oxidation  | Sulfation        | Abs/.1mm | *ASTM D7415 | >30        | 17.6        | 18.1        |          |
|  | FLUID DEGRA      | OATION   | method      | limit/base | current     | history1    | history2 |
| Base Number (BN) mg KOH/g   ASTM D2896   10.7   6.8   6.0  | Oxidation        | Abs/.1mm | *ASTM D7414 | >25        | 14.5        | 15.3        |          |
|  | Base Number (BN) | mg KOH/g | ASTM D2896  | 10.7       | 6.8         | 6.0         |          |



# **OIL ANALYSIS REPORT**

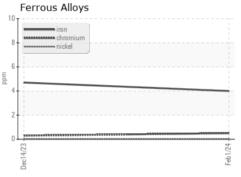


|                          | sity @ 1 | .00°C |      |      |
|--------------------------|----------|-------|------|------|
| 18 Abnor                 | nal      |       |      |      |
| 17-                      |          |       | <br> | <br> |
| 0016<br>Base<br>15<br>15 |          |       | <br> | <br> |
| 3 14 Abnor               |          |       | <br> | <br> |
| 12 Abnor                 | 1al      |       | <br> | <br> |
| 11 - 123                 |          |       |      | 5.4  |
| Dec14/23                 |          |       |      | 3    |

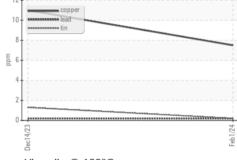
| VISUAL                  |        | method  | limit/base | current | history1 | history2 |
|-------------------------|--------|---------|------------|---------|----------|----------|
| White Metal             | scalar | *Visual | NONE       | NONE    | NONE     |          |
| Yellow Metal            | scalar | *Visual | NONE       | NONE    | NONE     |          |
| Precipitate             | scalar | *Visual | NONE       | NONE    | NONE     |          |
| Silt                    | scalar | *Visual | NONE       | NONE    | NONE     |          |
| Debris                  | scalar | *Visual | NONE       | NONE    | NONE     |          |
| Sand/Dirt               | scalar | *Visual | NONE       | NONE    | NONE     |          |
| Appearance              | scalar | *Visual | NORML      | NORML   | NORML    |          |
| Odor                    | scalar | *Visual | NORML      | NORML   | NORML    |          |
| <b>Emulsified Water</b> | scalar | *Visual | >0.2       | NEG     | NEG      |          |
| Free Water              | scalar | *Visual |            | NEG     | NEG      |          |

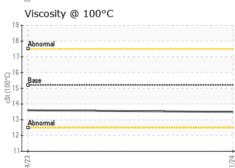
| FLUID PROPI  | ERHES | method    |      |      | history1 | history2 |
|--------------|-------|-----------|------|------|----------|----------|
| Visc @ 100°C | cSt   | ASTM D445 | 15.2 | 13.5 | 13.6     |          |

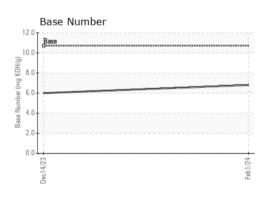
# **GRAPHS**



### Non-ferrous Metals











Certificate L2367

Laboratory Sample No.

Lab Number : 06099796 Unique Number : 10898026 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0095455 Received : 26 Feb 2024

Tested : 27 Feb 2024 Diagnosed : 27 Feb 2024 - Don Baldridge

GFL Environmental - 981 - Port Arthur Hauling

1000 S Business Park Dr Port Arthur, TX

US 77640 Contact: MICHAEL KAY

mkay@gflenv.com

T: (336)660-9331

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)