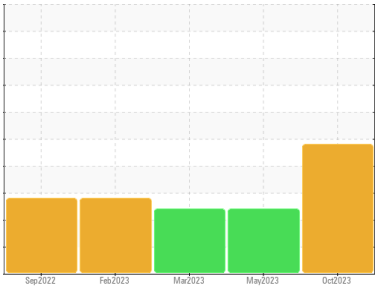
# PROBLEM SUMMARY

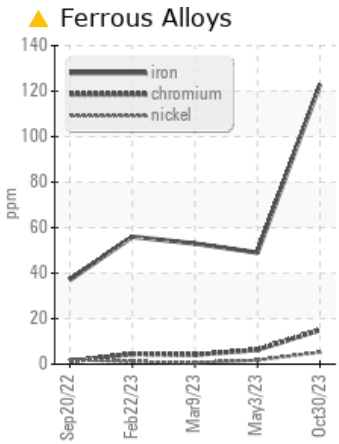
Machine Id
**277000-275**
Component
**Diesel Engine**
Fluid
**5w30 Multi-Flo (--- GAL)**

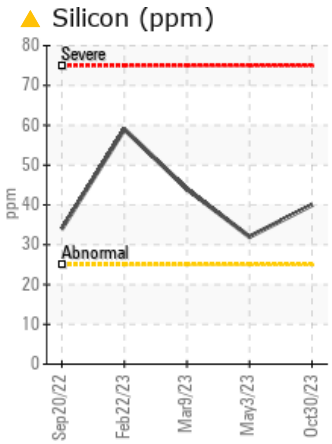
Sample Rating Trend

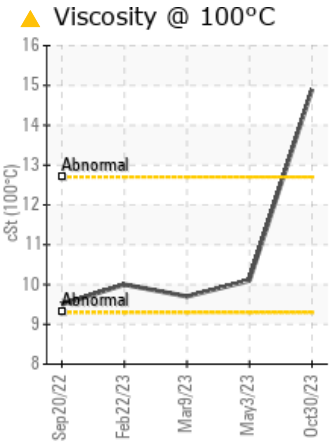


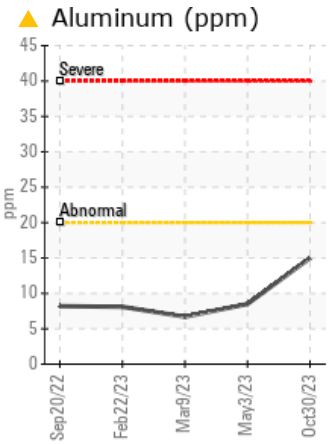

**DIRT**

## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

## PROBLEMATIC TEST RESULTS

| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | ▲ **123** | 49 | 53 |
| Aluminum | ppm | ASTM D5185m | >20 | ▲ **15** | ▲ 8 | ▲ 7 |
| Silicon | ppm | ASTM D5185m | >25 | ▲ **40** | ▲ 32 | ▲ 44 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | | ▲ **1.8** | 3.7 | 4.4 |
| Visc @ 100°C | cSt | ASTM D445 | | ▲ **14.9** | 10.1 | 9.7 |

**Customer Id:** GFL654S
**Sample No.:** GFL0097383
**Lab Number:** 05996207
**Test Package:** FLEET

*To manage this report scan the QR code*

*To discuss the diagnosis or test data:*
Jonathan Hester +1 919-379-4092 x4092
jhester@wearcheckusa.com

*To change component or sample information:*
Customer Service +1 1-800-237-1369
customerservice@wearcheck.com

## RECOMMENDED ACTIONS

| Action | Status | Date | Done By | Description |
|---|---|---|---|---|
| Change Fluid | --- | --- | ? | Oil and filter change at the time of sampling has been noted. |
| Change Filter | --- | --- | ? | Oil and filter change at the time of sampling has been noted. |
| Check Dirt Access | --- | --- | ? | We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. |

## HISTORICAL DIAGNOSIS

**03 May 2023 Diag: Don Baldridge**

DIRT

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Resample at the next service interval to monitor.All component wear rates are normal. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

view report

**09 Mar 2023 Diag: Sean Felton**

DIRT

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Resample at the next service interval to monitor.All component wear rates are normal. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

view report

**22 Feb 2023 Diag: Don Baldridge**

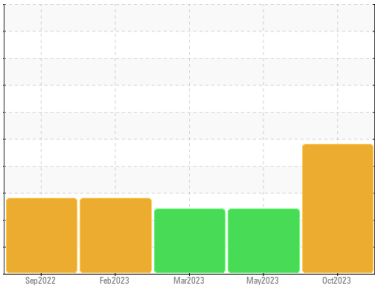
DIRT

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Resample at the next service interval to monitor.All component wear rates are normal. Fuel content negligible. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

view report

# OIL ANALYSIS REPORT

Sample Rating Trend




**DIRT**

Machine Id
**277000-275**
Component
**Diesel Engine**
Fluid
**5w30 Multi-Flo (--- GAL)**

## DIAGNOSIS

**Recommendation**
We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

**Wear**
Cylinder, crank, or cam shaft wear is indicated.

**Contamination**
Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress.

**Fluid Condition**
The oil viscosity is higher than normal. The BN level is low. Confirm oil type.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **GFL0097383** | GFL0067895 | GFL0067848 |
| Sample Date | | Client Info | | **30 Oct 2023** | 03 May 2023 | 09 Mar 2023 |
| Machine Age | mls | Client Info | | **172998** | 172998 | 172998 |
| Oil Age | mls | Client Info | | **172998** | 172998 | 0 |
| Oil Changed | | Client Info | | **Changed** | N/A | N/A |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | ABNORMAL |

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

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >100 | ▲ **123** | 49 | 53 |
| Chromium | ppm | ASTM D5185m | >20 | **15** | 6 | 4 |
| Nickel | ppm | ASTM D5185m | >4 | **5** | 2 | <1 |
| Titanium | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Silver | ppm | ASTM D5185m | >3 | **0** | 0 | 0 |
| Aluminum | ppm | ASTM D5185m | >20 | ▲ **15** | ▲ 8 | ▲ 7 |
| Lead | ppm | ASTM D5185m | >40 | **6** | 3 | 6 |
| Copper | ppm | ASTM D5185m | >330 | **23** | 17 | 31 |
| Tin | ppm | ASTM D5185m | >15 | **<1** | <1 | 1 |
| Vanadium | ppm | ASTM D5185m | | **<1** | 0 | <1 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | 0 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **25** | 16 | 31 |
| Barium | ppm | ASTM D5185m | | **<1** | 0 | <1 |
| Molybdenum | ppm | ASTM D5185m | | **172** | 185 | 83 |
| Manganese | ppm | ASTM D5185m | | **5** | 2 | 4 |
| Magnesium | ppm | ASTM D5185m | | **488** | 512 | 548 |
| Calcium | ppm | ASTM D5185m | | **1113** | 1239 | 922 |
| Phosphorus | ppm | ASTM D5185m | | **591** | 610 | 597 |
| Zinc | ppm | ASTM D5185m | | **748** | 764 | 730 |
| Sulfur | ppm | ASTM D5185m | | **1982** | 2234 | 2335 |

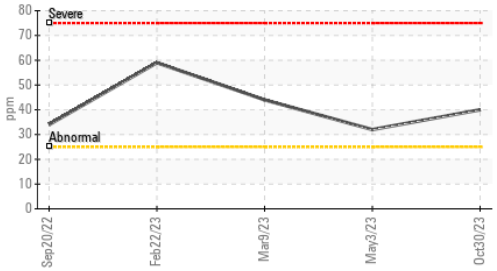
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >25 | ▲ **40** | ▲ 32 | ▲ 44 |
| Sodium | ppm | ASTM D5185m | | **22** | 14 | 28 |
| Potassium | ppm | ASTM D5185m | >20 | **15** | 12 | 22 |

| INFRA-RED | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Soot % | % | *ASTM D7844 | >3 | **0.1** | 0.1 | 0.1 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | **25.4** | 13.6 | 12.6 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | **38.5** | 23.6 | 23.0 |

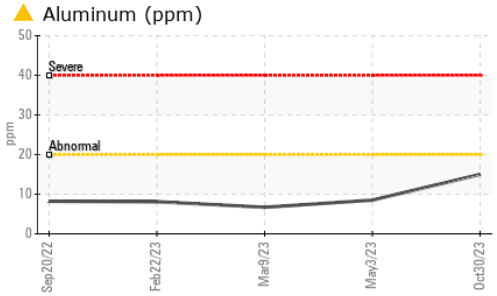
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | **50.2** | 21.0 | 18.8 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | | ▲ **1.8** | 3.7 | 4.4 |

# OIL ANALYSIS REPORT

Silicon (ppm)




Aluminum (ppm)

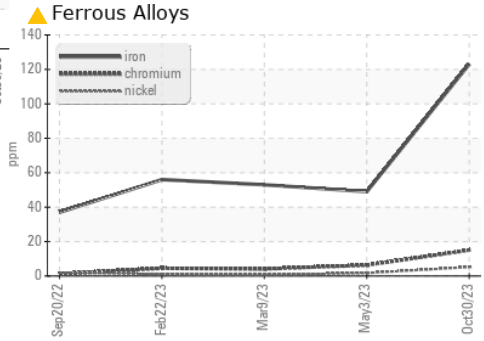



| VISUAL | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| White Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | **NONE** | NONE | NONE |
| 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 |

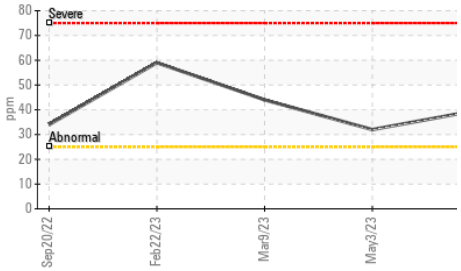
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 100°C | cSt | ASTM D445 | | ▲ **14.9** | 10.1 | 9.7 |

## GRAPHS

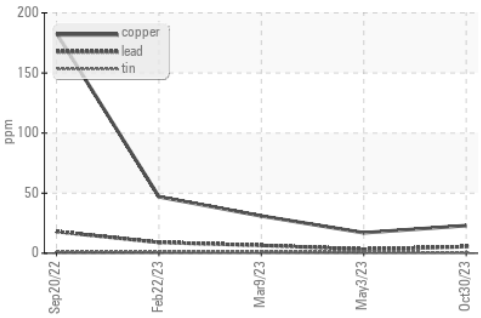
Ferrous Alloys



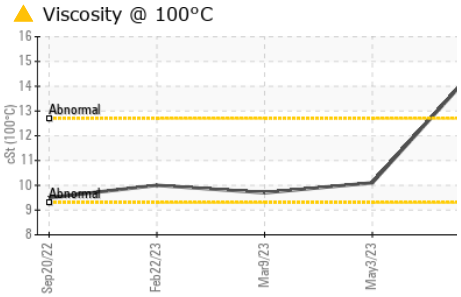

Silicon (ppm)



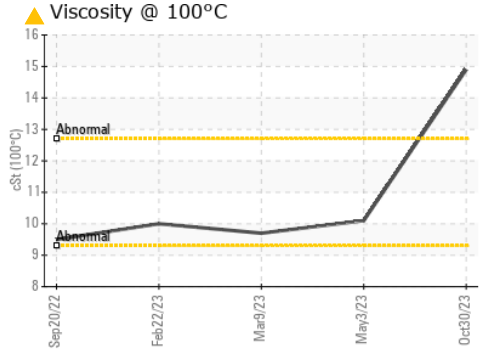

Non-ferrous Metals



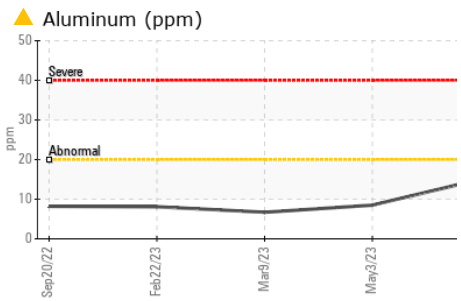

Viscosity @ 100°C



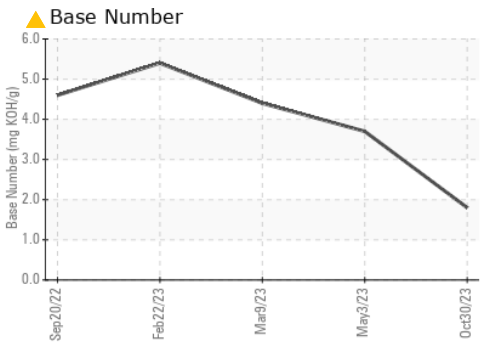

Viscosity @ 100°C




Aluminum (ppm)




Base Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : GFL0097383
**Lab Number** : 05996207
**Unique Number** : 10724567
**Test Package** : FLEET

**Received** : 01 Nov 2023
**Diagnosed** : 06 Nov 2023
**Diagnostician** : Jonathan Hester

*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)*

**GFL Environmental - 654S - Midlothian**
12230 Deergrove Road
Midlothian, VA
US 23112
Contact: Corbin Umphlet
cumphlet@gflenv.com
T:
F:

Report Id: GFL654S [WUSCAR] 05996207 (Generated: 11/06/2023 18:27:01) Rev: 1

Submitted By: Matt oversee 654, 654S, 659 - Matthew Shinault