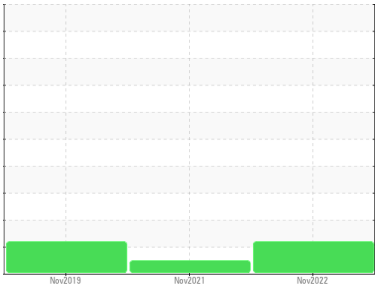
# PROBLEM SUMMARY

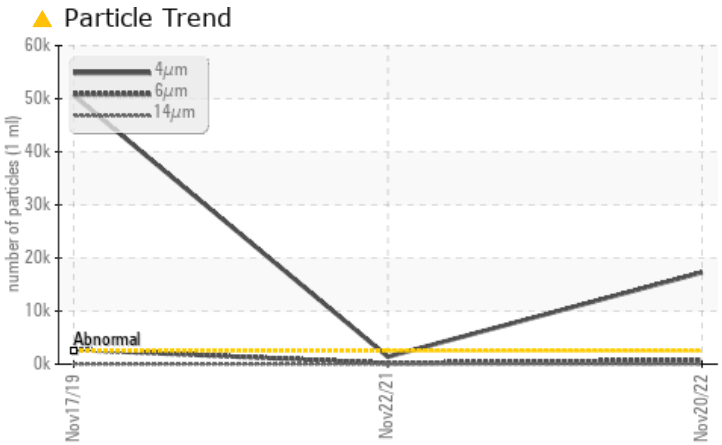
Sample Rating Trend




ISO

Machine Id
## GROVE 10061373 - CARRIER (S/N 41006058)
Component
**Hydraulic System**
Fluid
**SHELL NATURELLE HF-E ISO 32 (53 GAL)**

## COMPONENT CONDITION SUMMARY




## RECOMMENDATION

We recommend you service the filters on this component. Resample at the next service interval to monitor.

## PROBLEMATIC TEST RESULTS

| Sample Status | | | | ABNORMAL | NORMAL | ABNORMAL |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >2500 | ▲ **17279** | 1393 | ▲ 50640 |
| Particles >6µm | | ASTM D7647 | >640 | ▲ **769** | 178 | ▲ 2719 |
| Oil Cleanliness | | ISO 4406 (c) | >18/16/13 | ▲ **21/17/11** | 18/15/12 | ▲ 23/19/12 |

**Customer Id:** FLUSCHNY
**Sample No.:** WC0680550
**Lab Number:** 05714880
**Test Package:** IND 2

*To manage this report scan the QR code*

*To discuss the diagnosis or test data:*
Don Baldridge +1
don.b505@comcast.net

*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 Filter | --- | --- | ? | We recommend you service the filters on this component. |

## HISTORICAL DIAGNOSIS

**22 Nov 2021 Diag: Doug Bogart**

NORMAL

Resample at the next service interval to monitor. Please note that this is a corrected copy for laboratory data and diagnostic comment updates.All component wear rates are normal. There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

**17 Nov 2019 Diag: Jonathan Hester**

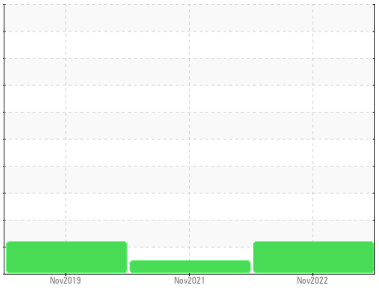
VISCOSITY

The filter change at the time of sampling has been noted. Resample at the next service interval to monitor.All component wear rates are normal. There is a high amount of silt (particulates < 14 microns in size) present in the oil. The oil viscosity is higher than normal. The AN level is acceptable for this fluid.

view report

# OIL ANALYSIS REPORT

Sample Rating Trend




ISO

Machine Id
## GROVE 10061373 - CARRIER (S/N 41006058)
Component
**Hydraulic System**
Fluid
**SHELL NATURELLE HF-E ISO 32 (53 GAL)**

## DIAGNOSIS

**Recommendation**
We recommend you service the filters on this component. Resample at the next service interval to monitor.

**Wear**
All component wear rates are normal.

**Contamination**
There is a high amount of silt (particulates < 14 microns in size) present in the oil.

**Fluid Condition**
The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

| SAMPLE INFORMATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Sample Number | | Client Info | | **WC0680550** | WC0524949 | WCI2345457 |
| Sample Date | | Client Info | | **20 Nov 2022** | 22 Nov 2021 | 17 Nov 2019 |
| Machine Age | mths | Client Info | | **0** | 0 | 5 |
| Oil Age | mths | Client Info | | **23** | 11 | 5 |
| Oil Changed | | Client Info | | **Not Changd** | Not Changd | Not Changd |
| Sample Status | | | | **ABNORMAL** | NORMAL | ABNORMAL |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185m | >20 | **2** | 2 | 5 |
| Chromium | ppm | ASTM D5185m | >20 | **0** | 0 | <1 |
| Nickel | ppm | ASTM D5185m | >20 | **0** | 0 | <1 |
| Titanium | ppm | ASTM D5185m | | **<1** | <1 | 0 |
| Silver | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Aluminum | ppm | ASTM D5185m | >20 | **<1** | 1 | <1 |
| Lead | ppm | ASTM D5185m | >20 | **3** | 3 | 7 |
| Copper | ppm | ASTM D5185m | >20 | **6** | 1 | 5 |
| Tin | ppm | ASTM D5185m | >20 | **1** | <1 | 1 |
| Antimony | ppm | ASTM D5185m | | **---** | 0 | 0 |
| Vanadium | ppm | ASTM D5185m | | **0** | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | | **0** | 0 | <1 |

| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185m | | **0** | <1 | 3 |
| Barium | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Molybdenum | ppm | ASTM D5185m | | **0** | 0 | <1 |
| Manganese | ppm | ASTM D5185m | | **<1** | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | **4** | 3 | 12 |
| Calcium | ppm | ASTM D5185m | | **4** | 35 | 5 |
| Phosphorus | ppm | ASTM D5185m | | **283** | 272 | 412 |
| Zinc | ppm | ASTM D5185m | | **74** | 63 | 139 |
| Sulfur | ppm | ASTM D5185m | | **2064** | 1860 | 1691 |

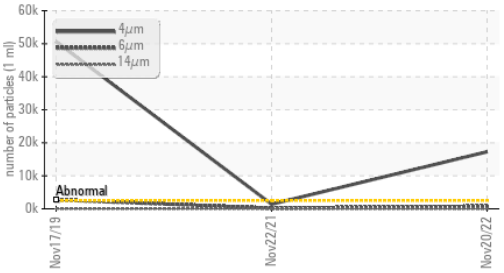
| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185m | >15 | **10** | 7 | 12 |
| Sodium | ppm | ASTM D5185m | | **<1** | 0 | 1 |
| Potassium | ppm | ASTM D5185m | >20 | **0** | 0 | <1 |

| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >2500 | ▲ **17279** | 1393 | ▲ 50640 |
| Particles >6µm | | ASTM D7647 | >640 | ▲ **769** | 178 | ▲ 2719 |
| Particles >14µm | | ASTM D7647 | >80 | **17** | 28 | 32 |
| Particles >21µm | | ASTM D7647 | >20 | **4** | 6 | 8 |
| Particles >38µm | | ASTM D7647 | >4 | **0** | 1 | 1 |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | 0 |
| Oil Cleanliness | | ISO 4406 (c) | >18/16/13 | ▲ **21/17/11** | 18/15/12 | ▲ 23/19/12 |

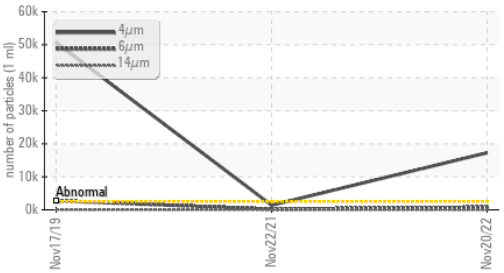
| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | | **1.22** | 0.889 | 1.287 |

# OIL ANALYSIS REPORT

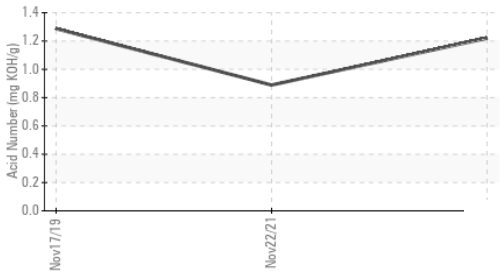
Particle Trend



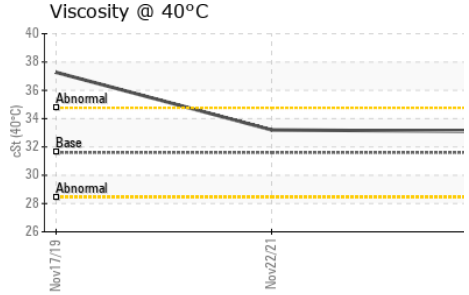

Particle Trend




Acid Number



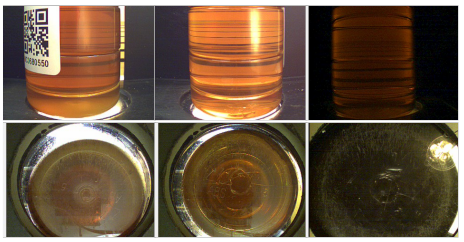

Viscosity @ 40°C




| 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 | **VLITE** | 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 | >0.05 | **NEG** | NEG | NEG |
| Free Water | scalar | *Visual | | **NEG** | NEG | NEG |

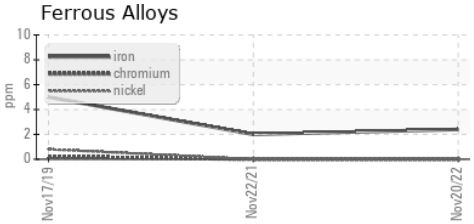
| FLUID PROPERTIES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Visc @ 40°C | cSt | ASTM D445 | 31.6 | **33.1** | 33.2 | ▲ 37.27 |

| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | | | | |
| Bottom | | | | | |

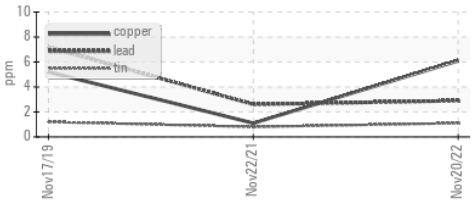


## GRAPHS

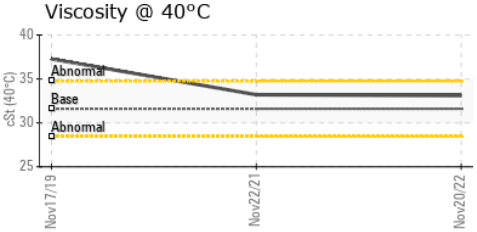
Ferrous Alloys



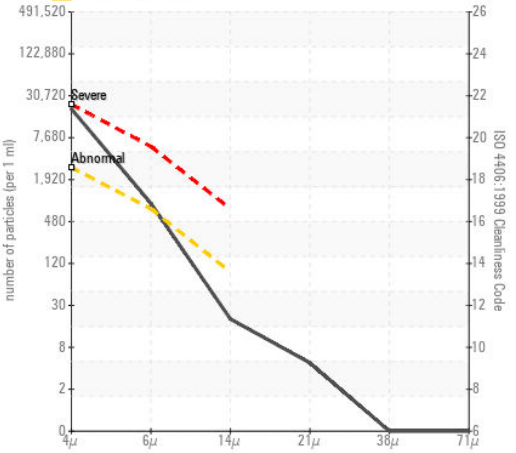

Non-ferrous Metals



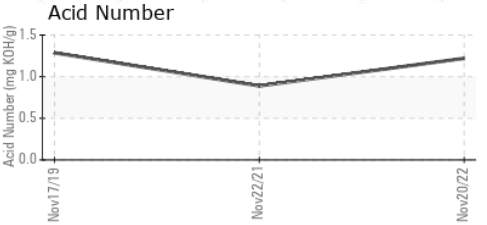

Viscosity @ 40°C




Particle Count




Acid Number




Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513
**Sample No.** : WC0680550
**Lab Number** : 05714880
**Unique Number** : 10254456
**Test Package** : IND 2

**Received** : 12 Dec 2022
**Diagnosed** : 14 Dec 2022
**Diagnostician** : Don Baldridge

**FLUOR MARINE PROPULSION LLC**
2401 RIVER RD
SCHENECTADY, NY
US 12309
Contact: Service Manager

*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)*

T:
F: