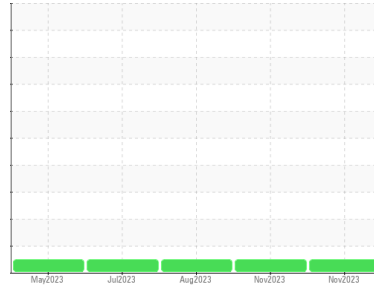




# OIL ANALYSIS REPORT

Sample Rating Trend

**NORMAL**



Area  
**[53561270]**  
 Machine Id  
**102-LYO-904**  
 Component  
**Hydraulic System**  
 Fluid  
**NAVI-GUARD PREMIUM AW-32 HYDRAULIC (--- LTR)**

## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

### Wear

All component wear rates are normal.

### Contamination

MPC (Membrane Patch Colorimetry) test indicates acceptable levels of varnish present. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable.

### Fluid Condition

The AN level is acceptable for this fluid. Linear Sweep Voltammetry (RULER – ASTM D6971) testing indicates normal levels of anti-oxidants present in the oil. The condition of the oil is suitable for further service.

## SAMPLE INFORMATION

|               | method      | limit/base  | current            | history1    | history2    |
|---------------|-------------|-------------|--------------------|-------------|-------------|
| Sample Number | Client Info |             | <b>WC0846257</b>   | WC0850082   | WC0770760   |
| Sample Date   | Client Info |             | <b>15 Nov 2023</b> | 03 Nov 2023 | 07 Aug 2023 |
| Machine Age   | yrs         | Client Info | <b>0</b>           | 0           | 0           |
| Oil Age       | yrs         | Client Info | <b>0</b>           | 0           | 0           |
| Oil Changed   | Client Info |             | <b>N/A</b>         | N/A         | N/A         |
| Sample Status |             |             | <b>NORMAL</b>      | ---         | NORMAL      |

## WEAR METALS

|          | method | limit/base      | current      | history1 | history2 |
|----------|--------|-----------------|--------------|----------|----------|
| Iron     | ppm    | ASTM D5185m >20 | <b>0</b>     | 0        | 0        |
| Chromium | ppm    | ASTM D5185m >20 | <b>0</b>     | 0        | 0        |
| Nickel   | ppm    | ASTM D5185m >20 | <b>0</b>     | 0        | 0        |
| Titanium | ppm    | ASTM D5185m     | <b>0</b>     | 0        | 0        |
| Silver   | ppm    | ASTM D5185m     | <b>0</b>     | 0        | 0        |
| Aluminum | ppm    | ASTM D5185m >20 | <b>&lt;1</b> | 0        | 0        |
| Lead     | ppm    | ASTM D5185m >20 | <b>0</b>     | 0        | 0        |
| Copper   | ppm    | ASTM D5185m >20 | <b>&lt;1</b> | 0        | <1       |
| Tin      | ppm    | ASTM D5185m >20 | <b>0</b>     | 0        | 0        |
| Vanadium | ppm    | ASTM D5185m     | <b>0</b>     | 0        | <1       |
| Cadmium  | ppm    | ASTM D5185m     | <b>0</b>     | 0        | 0        |

## ADDITIVES

|            | method | limit/base  | current      | history1 | history2 |
|------------|--------|-------------|--------------|----------|----------|
| Boron      | ppm    | ASTM D5185m | <b>&lt;1</b> | <1       | <1       |
| Barium     | ppm    | ASTM D5185m | <b>6</b>     | 0        | 0        |
| Molybdenum | ppm    | ASTM D5185m | <b>4</b>     | 0        | 4        |
| Manganese  | ppm    | ASTM D5185m | <b>0</b>     | 0        | 0        |
| Magnesium  | ppm    | ASTM D5185m | <b>12</b>    | 6        | 15       |
| Calcium    | ppm    | ASTM D5185m | <b>89</b>    | ▲ 71     | 99       |
| Phosphorus | ppm    | ASTM D5185m | <b>307</b>   | 307      | 326      |
| Zinc       | ppm    | ASTM D5185m | <b>385</b>   | 432      | 410      |
| Sulfur     | ppm    | ASTM D5185m | <b>5140</b>  | ▲ 2327   | 5313     |

## CONTAMINANTS

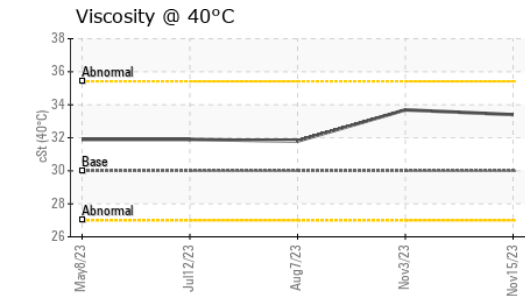
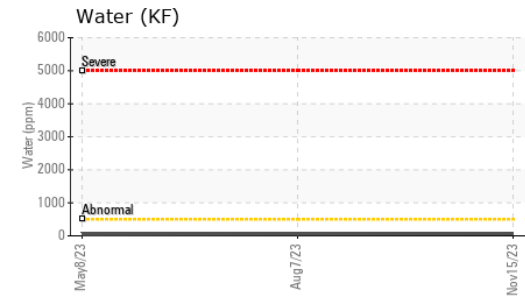
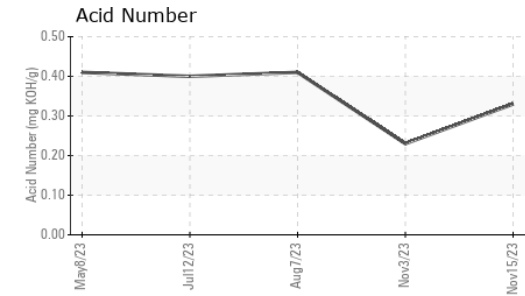
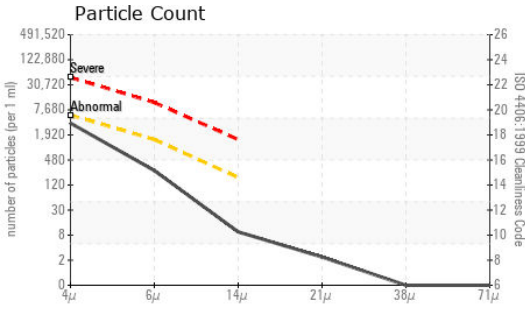
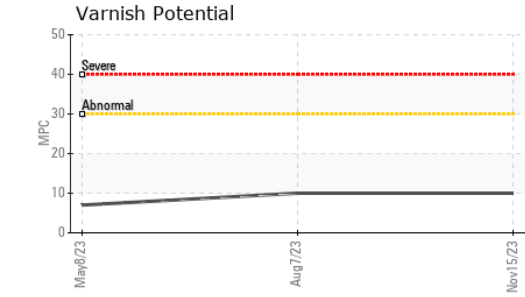
|           | method | limit/base       | current      | history1 | history2 |
|-----------|--------|------------------|--------------|----------|----------|
| Silicon   | ppm    | ASTM D5185m >15  | <b>&lt;1</b> | 0        | <1       |
| Sodium    | ppm    | ASTM D5185m      | <b>0</b>     | 1        | 0        |
| Potassium | ppm    | ASTM D5185m >20  | <b>&lt;1</b> | 0        | 0        |
| Water     | %      | ASTM D6304 >0.05 | <b>0.006</b> | ---      | 0.005    |
| ppm Water | ppm    | ASTM D6304 >500  | <b>65.6</b>  | ---      | 55.7     |

## FLUID CLEANLINESS

|                 | method       | limit/base | current         | history1 | history2 |
|-----------------|--------------|------------|-----------------|----------|----------|
| Particles >4µm  | ASTM D7647   | >5000      | <b>3212</b>     | 80       | 3427     |
| Particles >6µm  | ASTM D7647   | >1300      | <b>236</b>      | 38       | 432      |
| Particles >14µm | ASTM D7647   | >160       | <b>8</b>        | 5        | 22       |
| Particles >21µm | ASTM D7647   | >40        | <b>2</b>        | 2        | 5        |
| Particles >38µm | ASTM D7647   | >10        | <b>0</b>        | 0        | 0        |
| Particles >71µm | ASTM D7647   | >3         | <b>0</b>        | 0        | 0        |
| Oil Cleanliness | ISO 4406 (c) | >19/17/14  | <b>19/15/10</b> | 13/12/10 | 19/16/12 |



# OIL ANALYSIS REPORT



**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : WC0846257 **Received** : 16 Nov 2023  
**Lab Number** : 06009634 **Diagnosed** : 05 Dec 2023  
**Unique Number** : 10743396 **Diagnostician** : Doug Bogart  
**Test Package** : AOM 1 ( Additional Tests: KF )

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)

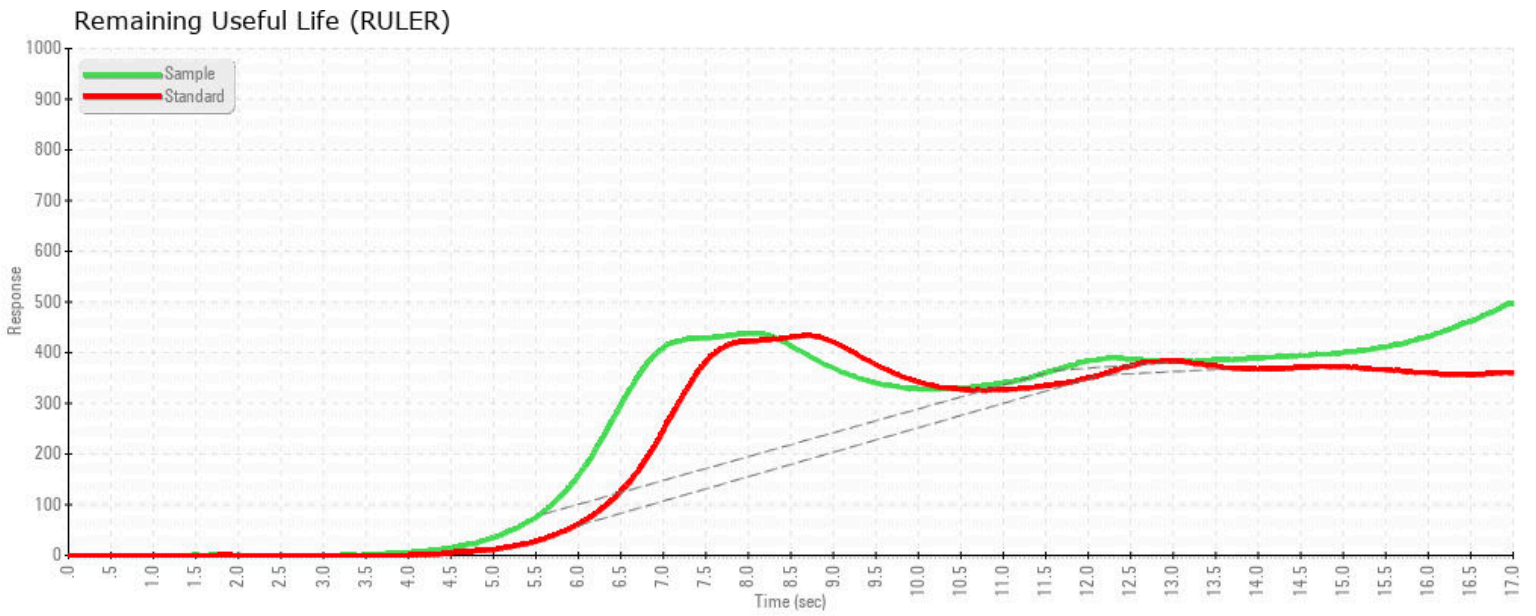
**MERCK & COMPANY**  
 5325 OLD OXFORD RD  
 DURHAM, NC  
 US 27712  
 Contact: Mark Montalvo  
 mark\_montalvo@merck.com  
 T: (919)884-4103  
 F:

| FLUID DEGRADATION     |          | method     | limit/base | current     | history1 | history2 |
|-----------------------|----------|------------|------------|-------------|----------|----------|
| Acid Number (AN)      | mg KOH/g | ASTM D8045 |            | <b>0.33</b> | 0.23     | 0.41     |
| Anti-Oxidant 1        | %        | ASTM D6971 | <25        | <b>104</b>  | ---      | ---      |
| Anti-Oxidant 2        | %        | ASTM D6971 | <25        | <b>66</b>   | ---      | ---      |
| MPC Varnish Potential | Scale    | ASTM D7843 | >15        | <b>10</b>   | ---      | 10       |

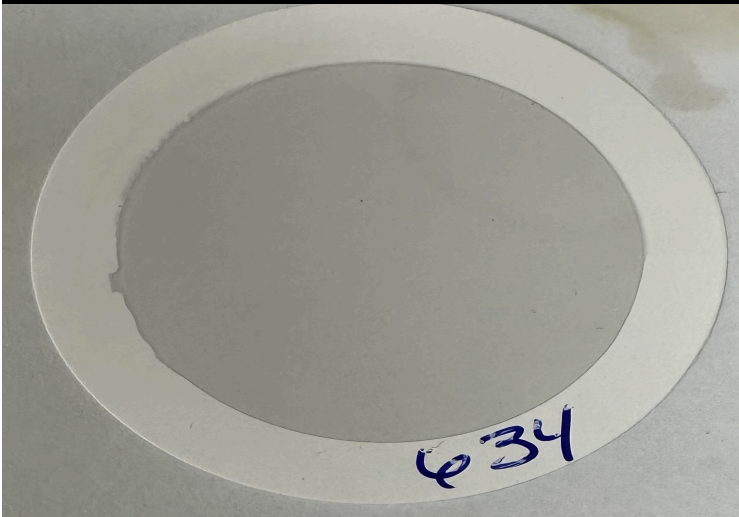
| VISUAL           |        | method  | limit/base | current      | history1 | history2 |
|------------------|--------|---------|------------|--------------|----------|----------|
| White Metal      | scalar | *Visual | NONE       | <b>NONE</b>  | NONE     | NONE     |
| Yellow Metal     | scalar | *Visual | NONE       | <b>NONE</b>  | NONE     | NONE     |
| Precipitate      | scalar | *Visual | NONE       | <b>NONE</b>  | NONE     | NONE     |
| 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 | >0.05      | <b>NEG</b>   | NEG      | NEG      |
| Free Water       | scalar | *Visual |            | <b>NEG</b>   | NEG      | NEG      |

| FLUID PROPERTIES     |       | method     | limit/base | current     | history1 | history2 |
|----------------------|-------|------------|------------|-------------|----------|----------|
| Visc @ 40°C          | cSt   | ASTM D445  | 30         | <b>33.4</b> | 33.69    | 31.8     |
| Visc @ 100°C         | cSt   | ASTM D445  | 5          | ---         | 6.1      | ---      |
| Viscosity Index (VI) | Scale | ASTM D2270 | 87         | ---         | ▲ 129    | ---      |

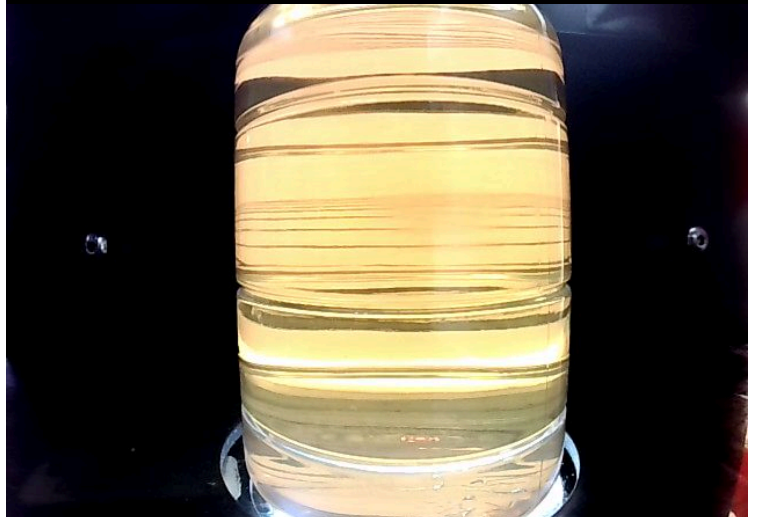
| SAMPLE IMAGES |  | method | limit/base | current | history1 | history2 |
|---------------|--|--------|------------|---------|----------|----------|
| Color         |  |        |            |         |          |          |
| Bottom        |  |        |            |         |          |          |
|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



MPC (Varnish Test)



Sample Color & Clarity



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