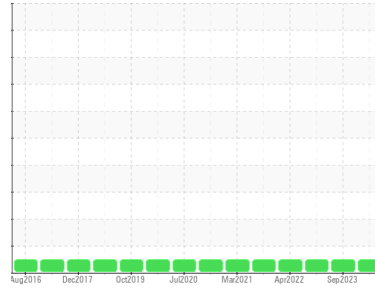




OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Machine Id
402 CRANE BRIDGE GEARBOX NORTH EAST
 Component
Gearbox
 Fluid
SHELL OMALA S4 GX 220 (24 LTR)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination 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 | | | WC0716512 | WC0811788 | WC0698320 |
| Sample Date | Client Info | | | 25 Mar 2024 | 18 Sep 2023 | 19 Sep 2022 |
| Machine Age | yrs | Client Info | | 0 | 0 | 0 |
| Oil Age | yrs | Client Info | | 0 | 0 | 0 |
| Oil Changed | Client Info | | | Not Changed | Not Changed | Not Changed |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |

| CONTAMINATION | | method | limit/base | current | history1 | history2 |
|---------------|-----------|--------|------------|------------|----------|----------|
| Water | WC Method | | >0.2 | NEG | NEG | NEG |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|-------------|-----|---------------|------------|--------------|----------|----------|
| PQ | | ASTM D8184* | | 15 | 9 | 2 |
| Iron | ppm | ASTM D5185(m) | >200 | 35 | 36 | 30 |
| Chromium | ppm | ASTM D5185(m) | >15 | 0 | 0 | 0 |
| Nickel | ppm | ASTM D5185(m) | >15 | <1 | <1 | <1 |
| Titanium | ppm | ASTM D5185(m) | | <1 | 0 | <1 |
| Silver | ppm | ASTM D5185(m) | | 0 | <1 | 0 |
| Aluminum | ppm | ASTM D5185(m) | >25 | <1 | <1 | <1 |
| Lead | ppm | ASTM D5185(m) | >100 | 0 | 0 | 0 |
| Copper | ppm | ASTM D5185(m) | >200 | <1 | 1 | <1 |
| Tin | ppm | ASTM D5185(m) | >25 | 0 | 0 | 0 |
| Antimony | ppm | ASTM D5185(m) | >5 | 0 | 0 | 0 |
| Vanadium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |
| Beryllium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |
| Cadmium | ppm | ASTM D5185(m) | | 0 | 0 | 0 |

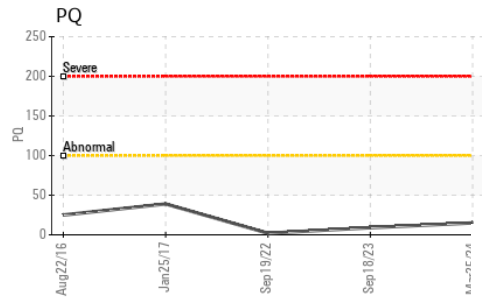
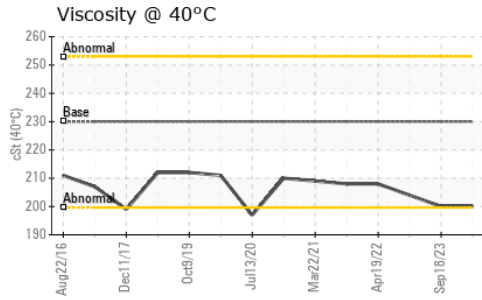
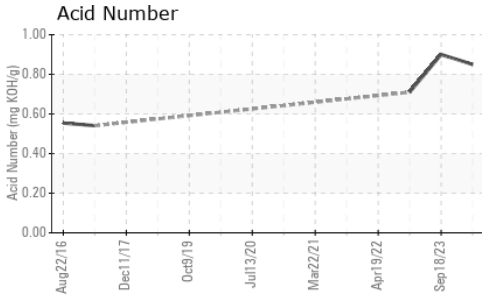
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|------------|-----|---------------|------------|--------------|----------|----------|
| Boron | ppm | ASTM D5185(m) | | 14 | 14 | 17 |
| Barium | ppm | ASTM D5185(m) | | <1 | 1 | <1 |
| Molybdenum | ppm | ASTM D5185(m) | | 12 | 13 | 13 |
| Manganese | ppm | ASTM D5185(m) | | 0 | 0 | <1 |
| Magnesium | ppm | ASTM D5185(m) | | <1 | 1 | <1 |
| Calcium | ppm | ASTM D5185(m) | | 19 | 20 | 20 |
| Phosphorus | ppm | ASTM D5185(m) | | 411 | 414 | 455 |
| Zinc | ppm | ASTM D5185(m) | | 10 | 11 | 8 |
| Sulfur | ppm | ASTM D5185(m) | | 5616 | 5556 | 5623 |
| Lithium | ppm | ASTM D5185(m) | | 1 | <1 | <1 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|--------------|-----|---------------|------------|-----------|----------|----------|
| Silicon | ppm | ASTM D5185(m) | >50 | 13 | 15 | 15 |
| Sodium | ppm | ASTM D5185(m) | | 3 | 4 | 3 |
| Potassium | ppm | ASTM D5185(m) | >20 | 2 | 2 | 2 |

| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|-------------------|----------|------------|------------|-------------|----------|----------|
| Acid Number (AN) | mg KOH/g | ASTM D974* | | 0.85 | 0.90 | 0.71 |



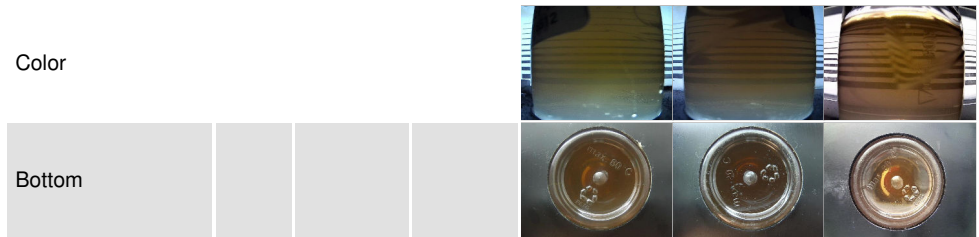
OIL ANALYSIS REPORT



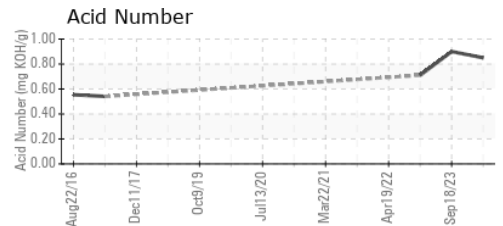
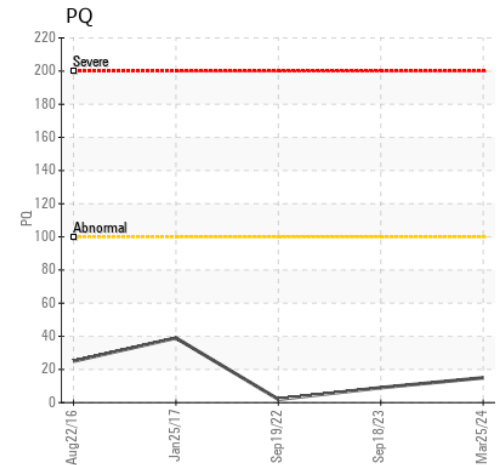
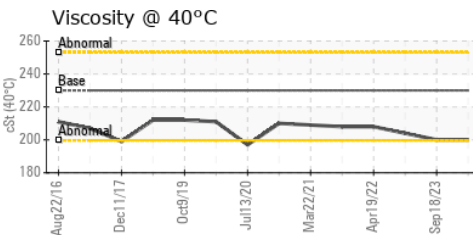
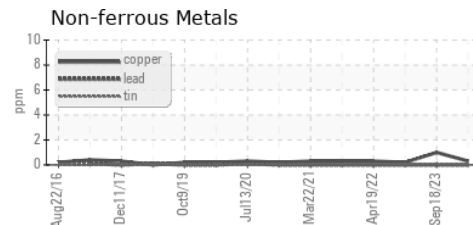
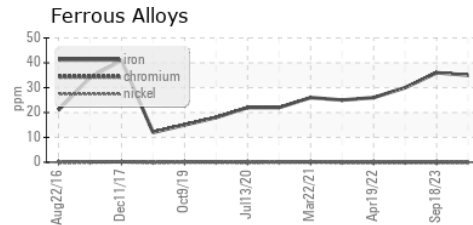
| VISUAL | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| White Metal | scalar | Visual* | NONE | NONE | NONE |
| Yellow Metal | scalar | Visual* | NONE | NONE | NONE |
| Precipitate | scalar | Visual* | NONE | NONE |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

| FLUID PROPERTIES | method | limit/base | current | history1 | history2 |
|------------------|--------|---------------|---------|----------|----------|
| Visc @ 40°C | cSt | ASTM D7279(m) | 230 | 200 | 204 |

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



GRAPHS



Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0716512 **Received** : 04 Apr 2024
Lab Number : 02626728 **Tested** : 04 Apr 2024
Unique Number : 5759860 **Diagnosed** : 04 Apr 2024 - Wes Davis
Test Package : IND 2 (Additional Tests: TAN Man)

Vale - Copper Cliff Smelter
 COPPER CLIFF SMELTER WAREHOUSE, 155 BALSAM ST.
 COPPER CLIFF, ON
 CA P0M 1N0
 Contact: Andy Kozachanko
 andrew.kozachanko@vale.com
 T: (705)682-6687
 F: (705)682-6939

To discuss this sample report, contact Customer Service at 1-800-268-2131.
 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
 Validity of results and interpretation are based on the sample and information as supplied.