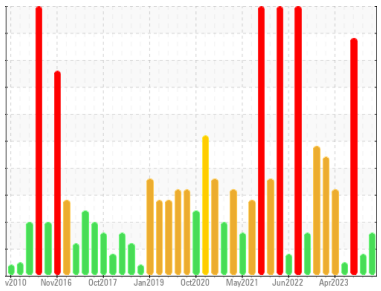
# OIL ANALYSIS REPORT

Sample Rating Trend




**VISCOSITY**

Area
## System 33 - Gas Compression
Machine Id
## Z-3301A Turbine Hydraulic Starter Oil Train A (S/N D-3309A)
Component
**Hydraulic System**
Fluid
**IRVING D & E ISO 32 (290 LTR)**

## 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 light amount of silt (particulates < 14 microns in size) present in the oil. The water content is negligible.

**Fluid Condition**
Viscosity of sample indicates oil is within ISO 15 range, advise investigate. 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 | | **PP** | PP | PP |
| Sample Date | | Client Info | | **15 Jun 2024** | 04 Apr 2024 | 24 Sep 2023 |
| Machine Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Age | hrs | Client Info | | **0** | 0 | 0 |
| Oil Changed | | Client Info | | **N/A** | N/A | N/A |
| Sample Status | | | | **ABNORMAL** | ABNORMAL | SEVERE |

| WEAR METALS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Iron | ppm | ASTM D5185(m) | >20 | **0** | 0 | 0 |
| Chromium | ppm | ASTM D5185(m) | >10 | **0** | 0 | 0 |
| Nickel | ppm | ASTM D5185(m) | >10 | **<1** | 0 | 0 |
| Titanium | ppm | ASTM D5185(m) | | **0** | 0 | 0 |
| Silver | ppm | ASTM D5185(m) | | **0** | 0 | <1 |
| Aluminum | ppm | ASTM D5185(m) | >10 | **<1** | 0 | <1 |
| Lead | ppm | ASTM D5185(m) | >20 | **0** | 0 | 0 |
| Copper | ppm | ASTM D5185(m) | >20 | **0** | 0 | <1 |
| Tin | ppm | ASTM D5185(m) | >10 | **0** | 0 | 0 |
| Antimony | ppm | ASTM D5185(m) | | **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 |

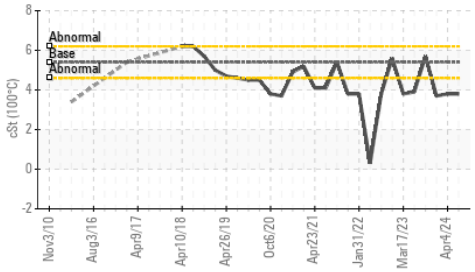
| ADDITIVES | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Boron | ppm | ASTM D5185(m) | 0.0 | **<1** | 0 | <1 |
| Barium | ppm | ASTM D5185(m) | 0.2 | **0** | 0 | <1 |
| Molybdenum | ppm | ASTM D5185(m) | 0.0 | **0** | 0 | 0 |
| Manganese | ppm | ASTM D5185(m) | | **0** | 0 | 0 |
| Magnesium | ppm | ASTM D5185(m) | 0.3 | **0** | 0 | 0 |
| Calcium | ppm | ASTM D5185(m) | 2.0 | **<1** | 0 | <1 |
| Phosphorus | ppm | ASTM D5185(m) | 4.6 | **4** | 1 | 3 |
| Zinc | ppm | ASTM D5185(m) | 7.4 | **<1** | <1 | 1 |
| Sulfur | ppm | ASTM D5185(m) | | **375** | 433 | 437 |
| Lithium | ppm | ASTM D5185(m) | | **<1** | <1 | <1 |

| CONTAMINANTS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Silicon | ppm | ASTM D5185(m) | >15 | **0** | 0 | <1 |
| Sodium | ppm | ASTM D5185(m) | | **0** | 0 | 0 |
| Potassium | ppm | ASTM D5185(m) | >20 | **<1** | 0 | 0 |
| Water | % | ASTM D6304* | >0.05 | **0.002** | 0.001 | 0.003 |
| ppm Water | ppm | ASTM D6304* | >500 | **23** | 1 | 32.6 |

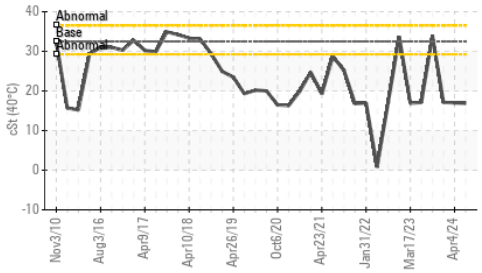
| FLUID CLEANLINESS | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Particles >4µm | | ASTM D7647 | >5000 | **5839** | 4727 | ▲ 55146 |
| Particles >6µm | | ASTM D7647 | >1300 | **1043** | 1055 | ▲ 20464 |
| Particles >14µm | | ASTM D7647 | >160 | **23** | 45 | ▲ 1962 |
| Particles >21µm | | ASTM D7647 | >40 | **7** | 8 | ▲ 504 |
| Particles >38µm | | ASTM D7647 | >10 | **2** | 1 | ▲ 45 |
| Particles >71µm | | ASTM D7647 | >3 | **0** | 0 | 4 |
| Oil Cleanliness | | ISO 4406 (c) | >19/17/14 | **20/17/12** | 19/17/13 | ▲ 23/22/18 |

# OIL ANALYSIS REPORT

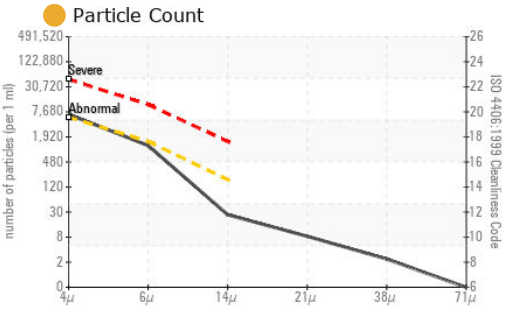
Viscosity @ 100°C



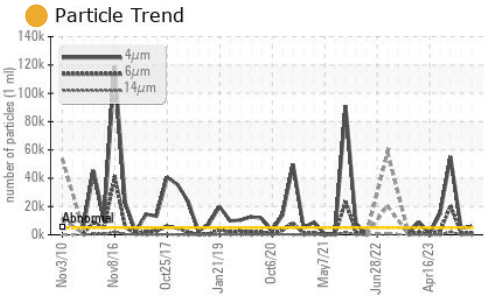

Viscosity @ 40°C



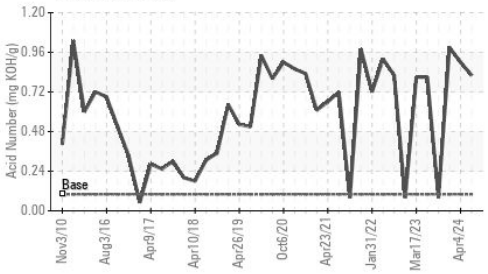

Particle Count




Particle Trend




Acid Number

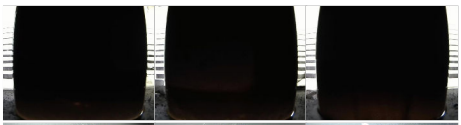



| FLUID DEGRADATION | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Acid Number (AN) | mg KOH/g | ASTM D974* | 0.10 | **0.82** | 0.90 | 0.99 |

| 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 | VLITE |
| Debris | scalar | Visual* | NONE | **NONE** | NONE | VLITE |
| Sand/Dirt | scalar | Visual* | NONE | **NONE** | VLITE | 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 D7279(m) | 32.5 | ▲ **16.9** | ▲ 17.0 | ▲ 17.1 |
| Visc @ 100°C | cSt | ASTM D7279(m) | 5.4 | ▲ **3.8** | ▲ 3.8 | ▲ 3.7 |
| Viscosity Index (VI) | Scale | ASTM D2270* | 99 | **115** | 114 | 101 |

| SEDIMENT | | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|---|
| Pentane Insolubles | % | ASTM D893(m)* | | **0.049** | 0.037 | 0.049 |

| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|---|
| Color | | |  | | |
| Bottom | | |  | | |
| MPC | | | *no image* | *no image* | *no image* |

ISO 17025:2017 Accredited Laboratory

**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
**Sample No.** : PP
**Lab Number** : 02644591
**Unique Number** : 5802130
**Test Package** : MAR 2 ( Additional Tests: COC Flash, KF, KV100, PntInsol, TAN Man, VI )

**Received** : 28 Jun 2024
**Tested** : 02 Jul 2024
**Diagnosed** : 02 Jul 2024 - Kevin Marson

**HIBERNIA MGMT & DEVELOPMENT CO. LTD**
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*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.*