

OIL ANALYSIS REPORT



Machine Id

PORT 33 Component Heat Transfer Fluid Fluid ROYAL 650 THERMAL OIL (--- GAL)

DIAGNOSIS

A Recommendation

We recommend you service the filters on this component. Resample at the next service interval to monitor. We were unable to perform a particle count due to a high concentration of particles present in this sample.

A Wear

Light concentration of visible metal present. All component wear rates are normal.

Contamination

Moderate concentration of visible dirt/debris present in the fluid.

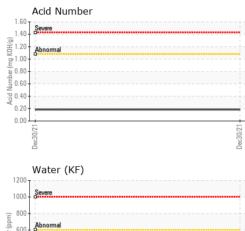
Fluid Condition

The AN level is acceptable for this fluid. The condition of the fluid is acceptable for the time in service.

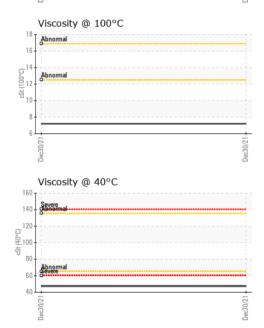
| Iron ppm ASTM D5185m >200 17 Chromium ppm ASTM D5185m >21 0 Nickel ppm ASTM D5185m >21 0 Titanium ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m 0 Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 | SAMPLE INFORM | ATION | method | limit/base | current | history1 | history2 |
|--|--|--|---|--|---|-----------------------------------|----------------------------------|
| Machine Age hrs Client Info 0 Oil Age hrs Client Info N/A Sample Status Client Info N/A WEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >200 17 KeAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >21 0 Nickel ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Auminum ppm ASTM D5185m >21 0 | Sample Number | | Client Info | | TO10000606 | | |
| Oil Age hrs Client Info 0 Oil Changed Client Info N/A Sample Status Image Current history1 history2 WEAR METALS method limit/base current history1 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >21 0 Nickel ppm ASTM D5185m >21 0 Silver ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 <tr< td=""><td>Sample Date</td><td></td><td>Client Info</td><td></td><td>30 Dec 2021</td><td></td><td></td></tr<> | Sample Date | | Client Info | | 30 Dec 2021 | | |
| Oil Changed Client Info N/A Sample Status Image Status <thimage status<="" th=""> <thimage status<="" th=""></thimage></thimage> | Machine Age | hrs | Client Info | | 0 | | |
| Sample Status Image Status | Oil Age | hrs | Client Info | | 0 | | |
| WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >200 17 Chromium ppm ASTM D5185m >21 0 Nickel ppm ASTM D5185m >21 0 | Oil Changed | | Client Info | | N/A | | |
| Iron ppm ASTM D5185m >200 17 Chromium ppm ASTM D5185m >21 0 Nickel ppm ASTM D5185m >21 0 Silver ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m 0 | Sample Status | | | | ABNORMAL | | |
| Chromium ppm ASTM D5185m >21 0 Nickel ppm ASTM D5185m >21 0 Titanium ppm ASTM D5185m >21 0 Silver ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Cadmium ppm ASTM D5185m 0 Boron ppm ASTM D5185m 0 Magnesium ppm ASTM D5185m 0 | WEAR METALS | | method | limit/base | current | history1 | history2 |
| Nickel ppm ASTM D5185m >21 0 Titanium ppm ASTM D5185m >21 0 Silver ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Vanadium ppm ASTM D5185m >21 0 | Iron | ppm | ASTM D5185m | >200 | 17 | | |
| Titanium ppm ASTM D5185m >21 0 Silver ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Tin ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Vanadium ppm ASTM D5185m >21 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 0 Magnaese ppm ASTM D5185m 0 < | Chromium | ppm | ASTM D5185m | >21 | 0 | | |
| Silver ppm ASTM D5185m >21 0 Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 0 Magnese ppm ASTM D5185m 0 | Nickel | ppm | ASTM D5185m | >21 | 0 | | |
| Aluminum ppm ASTM D5185m >21 0 Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 <1 | Titanium | ppm | ASTM D5185m | >21 | 0 | | |
| Lead ppm ASTM D5185m >21 0 Copper ppm ASTM D5185m >21 <1 | Silver | ppm | ASTM D5185m | >21 | 0 | | |
| Copper ppm ASTM D5185m >21 <1 Tin ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Malybdenum ppm ASTM D5185m 0 Manganese ppm ASTM D5185m 0 Manganesium ppm ASTM D5185m 0 | Aluminum | ppm | ASTM D5185m | >21 | 0 | | |
| Tin ppm ASTM D5185m >21 0 Antimony ppm ASTM D5185m >21 0 Vanadium ppm ASTM D5185m 21 0 Cadmium ppm ASTM D5185m Imit/base current history1 history2 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 0 Manganese ppm ASTM D5185m 0 Magnesium ppm ASTM D5185m 0 | Lead | ppm | ASTM D5185m | >21 | 0 | | |
| Antimony ppm ASTM D5185m >21 0 Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Magnaese ppm ASTM D5185m 0 Magnesium ppm ASTM D5185m 0 Magnesium ppm ASTM D5185m 0 Calcium ppm ASTM D5185m 0 Zinc ppm ASTM D5185m 0 | Copper | ppm | ASTM D5185m | >21 | <1 | | |
| Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 0 Manganese ppm ASTM D5185m 0 Magnesium ppm ASTM D5185m 0 Calcium ppm ASTM D5185m 0 Vinc ppm ASTM D5185m 0 Calcium ppm ASTM D5185m 0 Sulfur ppm ASTM D5185m 0 Sulfur ppm ASTM D5185m 214 | Tin | ppm | ASTM D5185m | >21 | 0 | | |
| CadmiumppmASTM D5185m0ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m0BariumppmASTM D5185m0MolybdenumppmASTM D5185m0ManganeseppmASTM D5185m0MagnesiumppmASTM D5185m0CalciumppmASTM D5185m0PhosphorusppmASTM D5185m0ZincppmASTM D5185m0SulfurppmASTM D5185m0SulfurppmASTM D5185m214SodiumppmASTM D5185m>200PotassiumppmASTM D5185m>200Water%ASTM D6304>0.06010.005 | Antimony | ppm | ASTM D5185m | >21 | 0 | | |
| ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m0BariumppmASTM D5185m0MolybdenumppmASTM D5185m0ManganeseppmASTM D5185m0MagnesiumppmASTM D5185m0CalciumppmASTM D5185m0PhosphorusppmASTM D5185m0ZincppmASTM D5185m0SulfurppmASTM D5185m0SulfurppmASTM D5185m214SodiumppmASTM D5185m>200PotassiumppmASTM D5185m>200Water%ASTM D6304>0.06010.005ppm WaterppmASTM D6304>60152.3 | Vanadium | ppm | ASTM D5185m | | 0 | | |
| Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 | Cadmium | ppm | ASTM D5185m | | 0 | | |
| Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 0 | | | | | | | |
| Molybdenum ppm ASTM D5185m 0 Manganese ppm ASTM D5185m < | ADDITIVES | | method | limit/base | current | history1 | history2 |
| Manganese ppm ASTM D5185m <1 Magnesium ppm ASTM D5185m 0 </td <td></td> <td>ppm</td> <td></td> <td>limit/base</td> <td></td> <td></td> <td></td> | | ppm | | limit/base | | | |
| Magnesium ppm ASTM D5185m 0 Calcium ppm ASTM D5185m 0 Phosphorus ppm ASTM D5185m 0 Zinc ppm ASTM D5185m 0 Sulfur ppm ASTM D5185m 0 Sulfur ppm ASTM D5185m 214 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 0 Sodium ppm ASTM D5185m >21 10 Potassium ppm ASTM D5185m >20 0 Water % ASTM D6304 >0.0601 0.005 ppm Water ppm ASTM D6304 <t< td=""><td>Boron</td><td></td><td>ASTM D5185m</td><td>limit/base</td><td>0</td><td></td><td></td></t<> | Boron | | ASTM D5185m | limit/base | 0 | | |
| Calcium ppm ASTM D5185m 3 Phosphorus ppm ASTM D5185m 0 2inc ppm ASTM D5185m 0 2inc ppm ASTM D5185m 0 Silicon ppm ASTM D5185m 214 Silicon ppm ASTM D5185m >25 0 Silicon ppm ASTM D5185m >25 0 Silicon ppm ASTM D5185m >21 10 Silicon Silicon Silicon Silicon Silicon Silicon <t< td=""><td>Boron Barium</td><td>ppm</td><td>ASTM D5185m ASTM D5185m</td><td>limit/base</td><td>0 0</td><td></td><td></td></t<> | Boron Barium | ppm | ASTM D5185m ASTM D5185m | limit/base | 0 0 | | |
| Phosphorus ppm ASTM D5185m 0 Zinc ppm ASTM D5185m 0 Sulfur ppm ASTM D5185m 214 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 0 Sodium ppm ASTM D5185m >21 10 Potassium ppm ASTM D5185m >20 0 Water % ASTM D6304 >0.0601 0.005 ppm Water ppm ASTM D6304 >601 52.3 | Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 0 | | |
| Zinc ppm ASTM D5185m 0 Sulfur ppm ASTM D5185m 214 | Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 0 <1 | | |
| Sulfur ppm ASTM D5185m 214 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 0 <td< td=""><td>Boron Barium Molybdenum Manganese Magnesium</td><td>ppm ppm ppm ppm</td><td>ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m</td><td>limit/base</td><td>0 0 0 <1 0</td><td></td><td></td></td<> | Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 0 <1 0 | | |
| CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 0 | Boron Barium Molybdenum Manganese Magnesium Calcium | ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 <1 0 3 | | |
| Silicon ppm ASTM D5185m >25 0 Sodium ppm ASTM D5185m >21 10 Potassium ppm ASTM D5185m >20 0 Water % ASTM D6304 >0.0601 0.005 ppm Water ppm ASTM D6304 >601 52.3 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus | ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 <1 0 3 0 | | |
| Sodium ppm ASTM D5185m >21 10 Potassium ppm ASTM D5185m >20 0 Water % ASTM D6304 >0.0601 0.005 ppm Water ppm ASTM D6304 >601 52.3 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 <1 0 3 0 0 | | |
| Potassium ppm ASTM D5185m >20 0 Water % ASTM D6304 >0.0601 0.005 ppm Water ppm ASTM D6304 >601 52.3 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | | 0 0 <1 0 3 0 0 214 | | |
| Water % ASTM D6304 >0.0601 0.005 ppm Water ppm ASTM D6304 >601 52.3 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 0 0 2 3 0 0 214 current | history1 | history2 |
| ppm Water ppm ASTM D6304 >601 52.3 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m | limit/base >25 | 0 0 2 1 0 3 0 0 214 current 0 | history1 | history2 |
| | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m | limit/base >25 >21 | 0 0 0 <1 0 3 0 0 214 current 0 10 | history 1 | history2 |
| FLUID DEGRADATION method limit/base current history1 history2 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m | limit/base >25 >21 >20 | 0 0 0 <1 0 3 0 0 214 current 0 10 0 | history1 | history2 |
| | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base >25 >21 >20 >0.0601 | 0 0 0 <1 0 3 0 0 214 current 0 10 0 0 0 0.005 | history1 | history2 |
| Acid Number (AN) mg KOH/g ASTM D8045 0.184 | Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water ppm Water | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D6304 | limit/base >25 >21 >20 >0.0601 >601 | 0 0 0 <1 0 3 0 0 214 current 0 10 0 0 0.005 52.3 | history1 | history2 |



OIL ANALYSIS REPORT

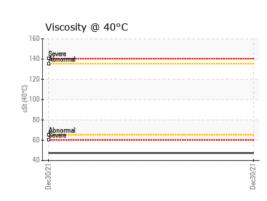






| VISUAL | | method | limit/base | current | history1 | history2 |
|----------------------|--------|------------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | 🔺 LIGHT | | |
| Yellow Metal | scalar | *Visual | NONE | NONE | | |
| Precipitate | scalar | *Visual | NONE | NONE | | |
| Silt | scalar | *Visual | NONE | NONE | | |
| Debris | scalar | *Visual | NONE | A MODER | | |
| Sand/Dirt | scalar | *Visual | NONE | NONE | | |
| Appearance | scalar | *Visual | NORML | NORML | | |
| Odor | scalar | *Visual | NORML | NORML | | |
| Emulsified Water | scalar | *Visual | >0.0601 | NEG | | |
| Free Water | scalar | *Visual | | NEG | | |
| FLUID PROPERT | IES | method | limit/base | current | history1 | history2 |
| Visc @ 40°C | cSt | ASTM D445 | | 47.3 | | |
| Visc @ 100°C | cSt | ASTM D445 | | 7.2 | | |
| Viscosity Index (VI) | Scale | ASTM D2270 | | 111 | | |
| SAMPLE IMAGES | 6 | method | limit/base | current | history1 | history2 |
| Color | | | | | no image | no image |
| Bottom | | | | | no image | no image |

GRAPHS



ERGON - CATOOSA

5645 E CHANNEL RD CATOOSA, OK US 74015

| | Lab Number | : 05438043 | Tested | : 07 Jan 2022 |
|---|--------------------------------|---------------------------|-----------------|-------------------------|
| | Unique Number | : 9802236 | Diagnosed | : 07 Jan 2022 - Doug Bo |
| | Certificate L2367 Test Package | : IND 2 (Additional Test | s: KF, KV100, | PrtCount, VI) |
| | To discuss this sample report | , contact Customer Servic | ce at 1-800-237 | 7-1369. |
| E | * - Denotes test methods that | are outside of the ISO 17 | 025 scope of a | accreditation. |

: TO10000606

: WearCheck USA - 501 Madison Ave., Cary, NC 27513

Received

: 06 Jan 2022

ogart Contact: BRIAN MORGAN Brian.Morgan@ergon.com T: Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F:

Report Id: BLUCAT [WUSCAR] 05438043 (Generated: 05/15/2024 09:22:04) Rev: 1

ANAR

Laboratory

Sample No.

Contact/Location: BRIAN MORGAN - BLUCAT