

OIL ANALYSIS REPORT

Sample Rating Trend







Machine Id **111005** Component **Diesel Engine** Fluid **NOT GIVEN (--- GAL)**

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

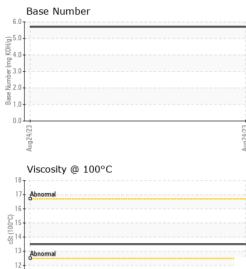
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

| SAMPLE INFORI | MATION | method | limit/base | current | history1 | history2 |
|---|---|---|---|---|--|--|
| Sample Number | | Client Info | | GFL0084513 | | |
| Sample Date | | Client Info | | 24 Aug 2023 | | |
| Machine Age | hrs | Client Info | | 3955 | | |
| Oil Age | hrs | Client Info | | 600 | | |
| Oil Changed | | Client Info | | Changed | | |
| Sample Status | | | | NORMAL | | |
| CONTAMINAT | ION | method | limit/base | current | history1 | history2 |
| Fuel | | WC Method | >5 | <1.0 | | |
| Glycol | | WC Method | | NEG | | |
| WEAR METAL | S | method | limit/base | current | history1 | history2 |
| Iron | ppm | ASTM D5185m | >100 | 22 | | |
| Chromium | ppm | ASTM D5185m | >20 | 2 | | |
| Nickel | ppm | ASTM D5185m | >4 | <1 | | |
| Titanium | ppm | ASTM D5185m | | 13 | | |
| Silver | ppm | ASTM D5185m | >3 | 0 | | |
| Aluminum | ppm | ASTM D5185m | >20 | 5 | | |
| Lead | ppm | ASTM D5185m | >40 | 2 | | |
| Copper | ppm | ASTM D5185m | >330 | 1 | | |
| Tin | ppm | ASTM D5185m | >15 | <1 | | |
| Vanadium | ppm | ASTM D5185m | | <1 | | |
| Cadmium | ppm | ASTM D5185m | | <1 | | |
| | | | | | | |
| ADDITIVES | | method | | | | history2 |
| ADDITIVES Boron | ppm | method ASTM D5185m | limit/base | current 45 | history1 | history2 |
| | ppm ppm | | limit/base | | | |
| Boron Barium | | ASTM D5185m | limit/base | 45 | | |
| Boron | ppm | ASTM D5185m ASTM D5185m | limit/base | 45 0 | | |
| Boron Barium Molybdenum | ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 45 0 40 | | |
| Boron Barium Molybdenum Manganese | ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 45 0 40 1 | | |
| Boron Barium Molybdenum Manganese Magnesium | ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 45 0 40 1 673 | | |
| 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 | 45 0 40 1 673 1506 | | |
| 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 | limit/base | 45 0 40 1 673 1506 623 | | |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 45 0 40 1 673 1506 623 787 | | |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur | ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 45 0 40 1 673 1506 623 787 3322 | | |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN | ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base | 45 0 40 1 673 1506 623 787 3322 current | | |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base >25 | 45 0 40 1 673 1506 623 787 3322 current 6 | history1 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m | limit/base >25 | 45 0 40 1 673 1506 623 787 3322 current 6 8 | history1 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m | limit/base >25 >20 limit/base | 45 0 40 1 673 1506 623 787 3322 current 6 8 17 | history1 | history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED | ppm ppm ppm ppm ppm ppm ppm ppm TS | ASTM D5185m ASTM D5185m | limit/base >25 >20 limit/base >3 | 45 0 40 1 673 1506 623 787 3322 current 6 8 17 current | history1 history1 | history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % | ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm | ASTM D5185m ASTM D5185m | limit/base >25 >20 limit/base >3 | 45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 | history1 history1 | history2 history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | limit/base >25 >20 limit/base >3 >20 | 45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 11.5 | history1 history1 | history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D5185m | Imit/base >25 >20 Imit/base >3 >20 >30 | 45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 11.5 23.4 | history1 history1 history1 | history2 history2 history2 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation | ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm | ASTM D5185m ASTM D7844 *ASTM D7844 | limit/base >25 >20 limit/base >3 >20 >30 >30 | 45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 11.5 23.4 current | history1 history1 history1 history1 | history2 history2 history2 history2 history2 |



11 Aug24/23

OIL ANALYSIS REPORT



| v Metal scalar *Visual vitate scalar *Visual scalar *Visual scalar *Visual Dirt scalar *Visual arance scalar *Visual arance scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method 2 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals -ferrous Metals -ferrous Metals | /isual NO /isual NO | 1-5 Vn024/23 | ONE N ONE N ONE N ONE N ORE N ORML N ORML N 0.2 N Imit/base 1 | NONE NONE NONE NONE NORML NEG NEG NEG 13.5 | | VISUAL | meth | hod limit/b | ase current | history1 | history2 |
|---|---|--|--|--|---|---------------------|---|---|--|------------------------|--|
| v Metal scalar *Visual vitate scalar *Visual scalar *Visual scalar *Visual Dirt scalar *Visual arance scalar *Visual arance scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method 2 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals -ferrous Metals -ferrous Metals | /isual NO /isual NO | NONE NONE NONE NONE NOR NOR NOR NOR NOR NOR NOR NOR NOR NOR | ONE N ONE N ONE N ONE N ORE N ORML N ORML N 0.2 N Imit/base 1 | NONE NONE NONE NONE NONE L NORML NEG NEG rase current history1 13.5 | | White Metal | scalar *Visua | al NONE | NONE | | |
| obitate scalar *Visual scalar *Visual Dirt scalar *Visual Dirt scalar *Visual arance scalar *Visual scalar *Visual scalar *Visual JID PROPERTIES method 20 100°C cSt ASTM D44 APHS ous Alloys iron chromium nickel -ferrous Metals | /isual NO /isual NO /isual NO /isual NO /isual NO /isual NO /isual >0. /isual In STM D445 | NONE NONE NONE NORML >0.2 Imit/bas | ONE N ONE N ONE N ORE N ORML N ORML N 0.2 N Imit/base 1 | Base Number | | Yellow Metal | | | | | |
| scalar *Visual scalar *Visual Dirt scalar *Visual arance scalar *Visual scalar *Visual scalar *Visual Mater scalar *Visual Mater scalar *Visual JID PROPERTIES method 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals | /isual NO /isual NO /isual NO /isual >0. /isual >0. /isual In STM D445 | NONE NORML NORML >0.2 Imit/bas | ONE N ONE N ORML N ORML N 0.2 N Iimit/base 1 | Base Number | | Precipitate | | | | | |
| s scalar *Visual Dirt scalar *Visual arance scalar *Visual scalar *Visual scalar *Visual Mater scalar *Visual Mater scalar *Visual JID PROPERTIES method 2 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals cooper head bosity @ 100°C | /isual NO /isual NO /isual NO /isual >0. /isual >0. /isual In STM D445 | NONE NORML NORML >0.2 Imit/bas | ONE N ONE N ORML N ORML N 0.2 N limit/base 1 | NONE NORML NEG NEG NEG 13.5 | | Silt | | | | | |
| arance scalar *Visual scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method 100°C cSt ASTM D44 APHS ous Alloys | /isual NO /isual NO /isual >0. /isual in STM D445 | NORML NORML >0.2 Iimit/bas | ORML N ORML N 0.2 N limit/base 1 | L NORML NEG NEG ase current history1 13.5 | | Debris | | | | | |
| scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method @ 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals -ferrous Metals -ferrous Metals | /isual NO /isual >0. /isual In method In STM D445 | NORML >0.2 | ORML N 0.2 N Iimit/base 1 | L NORML NEG Pase current history1 13.5 | | Sand/Dirt | scalar *Visua | al NONE | NONE | | |
| ified Water scalar *Visual Vater scalar *Visual JID PROPERTIES method © 100°C cSt ASTM D44 APHS ous Alloys iron chromium nickel -ferrous Metals copper lead tin | /isual >0. /isual Iir STM D445 | >0.2 limit/bas 1/5 | ORML N 0.2 N Iimit/base 1 | L NORML NEG Pase current history1 13.5 | Aug24/23 | | | | | | |
| Vater scalar *Visual JID PROPERTIES method © 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals bind bind copper lead tin | /isual lin STM D445 | limit/bas 15 br C2/t20ny | 0.2 N limit/base 1 control and a second s | NEG NEG ase current history1 13.5 | Aug2 | Odor | scalar *Visua | al NORM | | | |
| JID PROPERTIES method 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals copper lead bosity @ 100°C | nethod lin STM D445 | 1-5 Vn024/23 | EZ/F20ny EZ/F20ny EZ/F20ny EZ/F20ny EZ/F20ny EZ/F20ny Ba (0)H0y Bul 3.0 1.0 | Base Number | | Emulsified Water | scalar *Visua | al >0.2 | | | |
| P 100°C cSt ASTM D44 APHS ous Alloys ferrous Metals copper lead tin | STM D445 | 1-5 Vn024/23 | Ba 6.0 (0)HOX but ya 3.0 (0)HOX but ya 3.0 (0)H | 13.5 | | Free Water | scalar *Visua | al | NEG | | |
| P 100°C cSt ASTM D44 APHS ous Alloys ferrous Metals copper lead tin | STM D445 | 1-5 Vn024/23 | E2/h20ny 6.0 (0)h0y Bul 3.0 1.0 | Base Number | | FLUID PROPE | RTIES meti | hod limit/b | ase current | history1 | history2 |
| ous Alloys | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | Visc @ 100°C | | | | | |
| ous Alloys | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | GRAPHS | | | | | |
| -ferrous Metals | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | Ferrous Alloys | | | | | |
| -ferrous Metals | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | ²⁵ | | | | | |
| -ferrous Metals | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 20 | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 2.0 nickel | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 15- | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | Ē. 10 - | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 10 | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 5- | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | 23 | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | Aug24/23 | | ug24/ | | | |
| copper lead tin posity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | la | Aı | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 10 T | 15 | | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 6- | | | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | E | | | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 4 4 | | | | | |
| osity @ 100°C | | Aug24/23 | Ba 6.0 (^D HO) Bull a 3.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | | | | |
| | Aur.2473 | | Ba 6.0 5.0 (0) 10) 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | | | | |
| | EC/FComA | | Ba 6.0 5.0 (0) 10) 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 1.0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 2- | | | | | |
| | un v | | Ba 6.0 5.0 (0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 2 | | | | | |
| | | asse Muncher (mn KDH ki) | 6.0 5.0 (0) 100 4.0 100 100 100 100 100 100 100 100 100 1 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | | | 24/23 | | | |
| ma | | Asse Mumber (mrt KDH/n) | 6.0 5.0 (0) 100 4.0 100 100 100 100 100 100 100 100 100 1 | 6.0 5.0 (b)HOX bu 1.0 0.0 | | 2 | | Aug24/23 | | | |
| mal | | Base Mumber (non KOH/n) | (0) HOX 4.0 - Bu Ja 3.0 - emm 2.0 - 1.0 - | (b) 4.0 is guing 3.0 2.0 1.0 0.0 | | Viscosity @ 100°C | | Aug24/23 + | Base Num | her | |
| | | Base Mumber (Mrr COHA) | (0) HOX 4.0 - Bu Ja 3.0 - emm 2.0 - 1.0 - | (b) 4.0 is guing 3.0 2.0 1.0 0.0 | | Viscosity @ 100°C | | Aug24/23 | | ber | |
| | | Base Minmher Front VC | 1.0 | | | Viscosity @ 100°C | | Aug24/23 | 6.0 5.0 | ber | |
| | | Ase Mirmher D | 1.0 | | | Viscosity @ 100°C | | Aug24/23 + | 6.0 5.0 | ber | |
| | | ase | 1.0 | | | Viscosity @ 100°C | | Aug24/23 + | 6.0 5.0 | ber | |
| | | | 1.0 | | | Viscosity @ 100°C | | Aug24/23 + | 6.0 5.0 | ber | |
| mal | | 1 | | 0.0 | | Viscosity @ 100°C | | Aug24/23 | 6.0 5.0 | ber | |
| | | | | | | Viscosity @ 100°C | | Aug24/23 | 6.0 5.0 (6)HOX 6.0 Jaquing 2.0 | ber | |
| | 5 | 23 | | Aug24/i | | Viscosity @ 100°C | | Aug24/23 | 6.0 5.0 (0) HOX 4.0 bu 1.0 2.0 1.0 | ber | |
| | a24/2 | g24/2 | g24/2 | Au | | Viscosity @ 100°C | | | 6.0 5.0 (b)HOX bu) aquinity action 1.0 0.0 | ber | |
| | | | Chock USA 501 Madican Ava Carr | Check USA 501 Madison Ave. Cary NC 3 | | Visc | | osity @ 100°C | | osity @ 100°C | osity @ 100°C |
| | | | g 2023 | 3 | Viscosity @ 100°C | 501 Madison Ave., (| e., (| E2H2diny Cary, NC 2 | 6.0 5.0 (0)НОУ ВОД 3.0 1.0 0.0 2201 27513 GFL | ber Environmental - | 629 - Northern A 3947 US 131 |
| 5934Diagnosed: 22205Diagnostician: S | | | | | Laboratory Sample No. Lab Number Unique Number | Viscosity @ 100°C | 501 Madison Ave Received Diagnosed | Aug24/23 | 6.0 5.0 (0)НОУ ВО/ 10 1.0 0.0 27513 GFL 3 3 | . Environmental - | 629 - Northern A 3947 US 131 Kalkaska, N US 49646-842 |
| 5934Diagnosed: 22205Diagnostician: S | an : Sean Fe | ean Felton | | Contact: MITCH | Laboratory Sample No. Lab Number Unique Number Test Package | Viscosity @ 100°C | 501 Madison Ave Received Diagnosed Diagnostician | e., Cary, NC 2 : 29 Aug 202: : 29 Aug 202: : Sean Felton | 6.0 5.0 (0)НОУ ВО/ 10 1.0 0.0 27513 GFL 3 3 | . Environmental - | 629 - Northern A 3947 US 131 Kalkaska, N US 49646-842 |



Submitted By: Mitch Hershberger