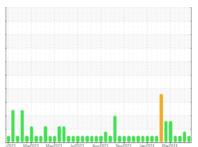


OIL ANALYSIS REPORT

Sample Rating Trend









Grand Blanc CAT 3 GBLM03BE

Biogas Engine

CHEVRON HDAX 9500 GAS ENGINE OIL 40 (--- GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: 400hr Oil Sample)

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 AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

| Sample Number Client Info WC0905700 WC0905698 WC0905776 Sample Date Client Info 24 Apr 2024 18 Apr 2024 10 Apr 2024 Machine Age hrs Client Info 395 413 0 Oill Age hrs Client Info Not Changd Not Changd N/A Oill Changed Client Info Not Changd N/A ABNORMAL NORMAL CONTAMINATION method Imitibase current history1 history1 Fuel WC Method -4.0 <1.0 <1.0 <1.0 Water WC Method -1 NEG NEG NEG NEG Ricg WC Method NEG NEG NEG NEG Nickel ppm ASTM D5185m -15 4 3 4 Chromium ppm ASTM D5185m 0 0 <1 1 Nickel ppm ASTM D5185m 0 0 <1 1 <1 <1 <1 | | | | | | | |
|---|------------------|----------|-------------|------------|-------------|---------------------------------------|-------------|
| Sample Date Client Info 24 Apr 2024 18 Apr 2024 10 Apr 202 Machine Age hrs Client Info 83171 82982 282825 Oil Age hrs Client Info 395 413 Not Changd N/A Oil Changed Client Info Not Changd Not Changd N/A ABNORMAL NORMAL CONTAMINATION method Imit blasse current history1 history1 Fuel WC Method >4.0 <1.0 | SAMPLE INFORM | MATION | method | limit/base | current | history1 | history2 |
| Machine Age hrs Client Info 83171 82982 82825 Oil Age hrs Client Info Not Changd Not | Sample Number | | Client Info | | WC0905700 | WC0905698 | WC0905754 |
| Oil Age hrs Client Info 395 413 0 Oil Changed Client Info Not Changd Not Changd N/A Sample Status Normal Normal Normal CONTAMINATION method limit/base current history1 history1 Fuel WC Method 4.0 <1.0 <1.0 <1.0 Water WC Method VE Method NEG NEG NEG WEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >15 4 3 4 Chromium ppm ASTM D5185m 0 0 <1 1 Iron ppm ASTM D5185m 4 4 1 2 1 Lead ppm ASTM D5185m 6 2 1 2 2 Copper ppm ASTM D5185m 9 | Sample Date | | Client Info | | 24 Apr 2024 | 18 Apr 2024 | 10 Apr 2024 |
| Cilient Info | Machine Age | hrs | Client Info | | 83171 | 82982 | 82825 |
| CONTAMINATION | Oil Age | hrs | Client Info | | 395 | 413 | 0 |
| CONTAMINATION | Oil Changed | | Client Info | | Not Changd | Not Changd | N/A |
| Fuel WC Method >4.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 | Sample Status | | | | NORMAL | ABNORMAL | NORMAL |
| Water WC Method >.11 NEG NEG NEG NEG Glycol WC Method Imitibase current history1 history1 WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >15 4 3 4 Chromium ppm ASTM D5185m >4 <1 | CONTAMINATIO | N | method | limit/base | current | history1 | history2 |
| WEAR METALS | Fuel | | WC Method | >4.0 | <1.0 | <1.0 | <1.0 |
| WEAR METALS | Water | | WC Method | >.11 | NEG | NEG | NEG |
| Iron | Glycol | | WC Method | | NEG | NEG | NEG |
| Chromium ppm ASTM D5185m >4 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <td>WEAR METALS</td> <td></td> <td>method</td> <td>limit/base</td> <th>current</th> <td>history1</td> <td>history2</td> | WEAR METALS | | method | limit/base | current | history1 | history2 |
| Nickel | Iron | ppm | ASTM D5185m | >15 | 4 | 3 | 4 |
| Titanium ppm ASTM D5185m <1 0 <1 Silver ppm ASTM D5185m 0 0 0 Aluminum ppm ASTM D5185m >6 2 1 2 Lead ppm ASTM D5185m >9 0 0 2 Copper ppm ASTM D5185m >6 4 6 5 Tin ppm ASTM D5185m >4 1 1 2 Vanadium ppm ASTM D5185m 0 0 <1 | Chromium | ppm | ASTM D5185m | >4 | <1 | <1 | <1 |
| Titanium ppm ASTM D5185m <1 0 <1 Silver ppm ASTM D5185m 0 0 0 Aluminum ppm ASTM D5185m >6 2 1 2 Lead ppm ASTM D5185m >9 0 0 2 Copper ppm ASTM D5185m >9 0 0 2 Copper ppm ASTM D5185m >4 -1 1 2 Vanadium ppm ASTM D5185m 0 0 -1 1 Vanadium ppm ASTM D5185m 0 0 -1 1 Cadmium ppm ASTM D5185m 0 0 -1 1 Boron ppm ASTM D5185m 0 1 0 0 -1 1 0 Barium ppm ASTM D5185m 0 1 1 0 0 1 1 0 1 0 1 1 | Nickel | ppm | ASTM D5185m | | 0 | 0 | <1 |
| Silver ppm ASTM D5185m 0 0 0 Aluminum ppm ASTM D5185m >6 2 1 2 Lead ppm ASTM D5185m >6 4 6 5 Copper ppm ASTM D5185m >6 4 6 5 Tin ppm ASTM D5185m >6 4 6 5 Vanadium ppm ASTM D5185m 0 0 <1 1 2 Vanadium ppm ASTM D5185m 0 0 <1 1 2 Vanadium ppm ASTM D5185m 0 0 <1 1 1 ADDITIVES method limit/base current history1 history1 history1 Boron ppm ASTM D5185m 0 1 0 0 1 0 Molydenum ppm ASTM D5185m 4 4 4 4 4 4 4 4 <td>Titanium</td> <td></td> <td>ASTM D5185m</td> <td></td> <th><1</th> <td>0</td> <td><1</td> | Titanium | | ASTM D5185m | | <1 | 0 | <1 |
| Aluminum ppm ASTM D5185m >6 2 1 2 Lead ppm ASTM D5185m >9 0 0 2 Copper ppm ASTM D5185m >6 4 ♠ 6 5 Tin ppm ASTM D5185m >6 4 ♠ 6 5 Vanadium ppm ASTM D5185m O 0 <1 1 2 Vanadium ppm ASTM D5185m O 0 <1 1 Cadmium ppm ASTM D5185m Q 0 0 <1 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m Q 1 0 0 Molybdenum ppm ASTM D5185m Q 1 0 0 1 0 Molybdenum ppm ASTM D5185m Q 13 16 9 1 1 1 1 | Silver | | | | 0 | | |
| Lead ppm ASTM D5185m >9 0 0 2 Copper ppm ASTM D5185m >6 4 ▲ 6 5 Tin ppm ASTM D5185m >4 <1 1 2 Vanadium ppm ASTM D5185m 0 0 <1 1 Cadmium ppm ASTM D5185m 0 0 <1 1 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 4 7 4 Barium ppm ASTM D5185m 0 1 0 Molybdenum ppm ASTM D5185m 4 4 4 4 Manganese ppm ASTM D5185m 21 1 1 1 Magnesium ppm ASTM D5185m 2009 1947 1871 1871 Phosphorus ppm ASTM D5185m 292 293 298 298 <tr< td=""><td></td><td></td><td>ASTM D5185m</td><td>>6</td><th>-</th><td></td><td></td></tr<> | | | ASTM D5185m | >6 | - | | |
| Copper ppm ASTM D5185m >6 4 ▲ 6 5 Tin ppm ASTM D5185m >4 <1 | | | | | | | |
| Tin | | | | | | | |
| Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 4 7 4 Barium ppm ASTM D5185m 0 1 0 Molybdenum ppm ASTM D5185m 4 4 4 Manganese ppm ASTM D5185m <1 1 1 Magnesium ppm ASTM D5185m 2009 1947 1871 Phosphorus ppm ASTM D5185m 292 293 298 Zinc ppm ASTM D5185m 360 371 350 Sulfur ppm ASTM D5185m 3717 3444 328 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >21 4 4 | | | | | - | | |
| Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 4 7 4 Barium ppm ASTM D5185m 0 1 0 Molybdenum ppm ASTM D5185m 4 4 4 Manganese ppm ASTM D5185m <1 | | | | 7 4 | | | |
| ADDITIVES | | | | | - | | |
| Boron | | ррпп | | | | | |
| Barium ppm ASTM D5185m 0 1 0 Molybdenum ppm ASTM D5185m 4 4 4 Manganese ppm ASTM D5185m <1 | ADDITIVES | | method | limit/base | current | · · · · · · · · · · · · · · · · · · · | history2 |
| Molybdenum ppm ASTM D5185m 4 1 2 2 2 3 3 2 2 3 3 2 3 3 3 2 3 3 3 3 | Boron | ppm | ASTM D5185m | | - | 7 | 4 |
| Manganese ppm ASTM D5185m <1 1 1 Magnesium ppm ASTM D5185m 13 16 9 Calcium ppm ASTM D5185m 2009 1947 1871 Phosphorus ppm ASTM D5185m 292 293 298 Zinc ppm ASTM D5185m 360 371 350 Sulfur ppm ASTM D5185m 3717 3444 3328 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Barium | ppm | ASTM D5185m | | 0 | 1 | 0 |
| Magnesium ppm ASTM D5185m 13 16 9 Calcium ppm ASTM D5185m 2009 1947 1871 Phosphorus ppm ASTM D5185m 292 293 298 Zinc ppm ASTM D5185m 360 371 350 Sulfur ppm ASTM D5185m 3717 3444 3328 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Molybdenum | ppm | ASTM D5185m | | 4 | 4 | 4 |
| Calcium ppm ASTM D5185m 2009 1947 1871 Phosphorus ppm ASTM D5185m 292 293 298 Zinc ppm ASTM D5185m 360 371 350 Sulfur ppm ASTM D5185m 3717 3444 3328 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Manganese | ppm | ASTM D5185m | | <1 | 1 | 1 |
| Phosphorus ppm ASTM D5185m 292 293 298 Zinc ppm ASTM D5185m 360 371 350 Sulfur ppm ASTM D5185m 3717 3444 3328 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Magnesium | ppm | ASTM D5185m | | 13 | 16 | 9 |
| Zinc ppm ASTM D5185m 360 371 350 Sulfur ppm ASTM D5185m 3717 3444 3328 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Calcium | ppm | ASTM D5185m | | 2009 | 1947 | 1871 |
| Sulfur ppm ASTM D5185m 3717 3444 3328 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Phosphorus | ppm | ASTM D5185m | | 292 | 293 | 298 |
| CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 | Zinc | ppm | ASTM D5185m | | 360 | 371 | 350 |
| Silicon ppm ASTM D5185m >181 106 78 84 Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 3 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0.1 0.1 0.1 0.1 Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | Sulfur | ppm | ASTM D5185m | | 3717 | 3444 | 3328 |
| Sodium ppm ASTM D5185m >21 4 4 3 Potassium ppm ASTM D5185m >20 0 <1 3 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0.1 0.1 0.1 0.1 Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | CONTAMINANTS | ; | method | limit/base | current | history1 | history2 |
| Potassium ppm ASTM D5185m >20 0 <1 3 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0.1 0.1 0.1 Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | Silicon | ppm | ASTM D5185m | >181 | 106 | 78 | 84 |
| Potassium ppm ASTM D5185m >20 0 <1 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 0.1 0.1 0.1 Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | Sodium | ppm | ASTM D5185m | >21 | 4 | 4 | 3 |
| Soot % % *ASTM D7844 0.1 0.1 0.1 Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | Potassium | ppm | ASTM D5185m | >20 | 0 | <1 | 3 |
| Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | INFRA-RED | | method | limit/base | current | history1 | history2 |
| Nitration Abs/cm *ASTM D7624 6.3 5.9 6.1 Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | Soot % | % | *ASTM D7844 | | 0.1 | 0.1 | 0.1 |
| Sulfation Abs/.1mm *ASTM D7415 22.6 20.4 21.6 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | | | | | | | |
| Oxidation Abs/.1mm *ASTM D7414 15.5 12.5 14.2 Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | | | | | | | |
| Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | FLUID DEGRADA | ATION | method | limit/base | current | history1 | history2 |
| Acid Number (AN) mg KOH/g ASTM D8045 1.0 1.71 1.05 1.59 | Oxidation | Abs/.1mm | *ASTM D7414 | | 15.5 | 12.5 | 14.2 |
| , , | | | | 1.0 | | | |
| | Base Number (BN) | mg KOH/g | ASTM D2896 | 5.4 | 3.10 | 3.23 | 3.29 |



OIL ANALYSIS REPORT







Laboratory Sample No.

Lab Number : 06161679 Unique Number : 10997102

cSt (100°C)

10

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0905700 Received

: 26 Apr 2024 **Tested** : 29 Apr 2024 Diagnosed : 29 Apr 2024 - Sean Felton

EDL NA Recips-Grand Blanc Grand Blanc Powerstation, 2361 West Grand Blanc Road

Grand Blanc, MI US 48439 Contact: Tony Saint Marie

Test Package : MOB 2 Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369.

 st - 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)

tony.saintmarie@edlenergy.com

T:

F: