

# **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id **A-322** Component **Diesel Engine** Fluid **PHILLIPS 66 15W40 (--- GAL)** 

#### DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

# Wear

All component wear rates are normal.

## Contamination

There is no indication of any contamination in the oil.

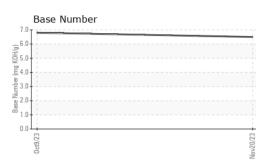
### Fluid Condition

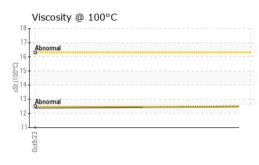
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

|   |  |  | 0ct2023   | Nov2023   |  |  |
|---|--|--|---|---|--|--|
| SAMPLE INFORM   | IATION   | method   | limit/base  | current   | history1   | history2   |
| Sample Number   |  | Client Info  |   | WC0828498   | WC0780409  |  |
| Sample Date   |  | Client Info  |   | 20 Nov 2023   | 09 Oct 2023  |  |
| Machine Age   | hrs  | Client Info  |   | 6566  | 6273   |  |
| Oil Age   | hrs  | Client Info  |   | 293   | 342  |  |
| Oil Changed   |  | Client Info  |   | Changed   | Changed  |  |
| Sample Status   |  |  |   | NORMAL  | MARGINAL   |  |
| CONTAMINATION   | ٧  | method   | limit/base  | current   | history1   | history2   |
| Fuel  |  | WC Method  | >5  | <1.0  | 4.4  |  |
| Water   |  | WC Method  | >0.2  | NEG   | NEG  |  |
| Glycol  |  | WC Method  |   | NEG   | NEG  |  |
| WEAR METALS   |  | method   | limit/base  | current   | history1   | history2   |
| Iron  | ppm  | ASTM D5185m  | >100  | 8   | 12   |  |
| Chromium  | ppm  | ASTM D5185m  | >20   | <1  | <1   |  |
| Nickel  | ppm  | ASTM D5185m  | >4  | 0   | <1   |  |
| Titanium  | ppm  | ASTM D5185m  |   | <1  | <1   |  |
| Silver  | ppm  | ASTM D5185m  | >3  | 0   | 0  |  |
| Aluminum  | ppm  | ASTM D5185m  | >20   | 6   | 7  |  |
| Lead  | ppm  | ASTM D5185m  | >40   | 3   | 5  |  |
| Copper  | ppm  | ASTM D5185m  | >330  | 4   | 4  |  |
| Tin   | ppm  | ASTM D5185m  | >15   | <1  | 1  |  |
| Vanadium  | ppm  | ASTM D5185m  |   | 0   | 0  |  |
| Cadmium   | ppm  | ASTM D5185m  |   | 0   | 0  |  |
|   |  |  |   | •   |  |  |
| ADDITIVES   |  | method   | limit/base  | current   | history1   | history2   |
| ADDITIVES<br>Boron  | ppm  |  | limit/base  | -   | -  | history2   |
|   |  | method   | limit/base  | current   | history1   |  |
| Boron   | ppm  | method<br>ASTM D5185m  | limit/base  | current   | history1<br>76   |  |
| Boron<br>Barium   | ppm<br>ppm   | method<br>ASTM D5185m<br>ASTM D5185m   | limit/base  | current<br>55<br>0  | history1<br>76<br>0  |  |
| Boron<br>Barium<br>Molybdenum   | ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | current<br>55<br>0<br>99  | history1<br>76<br>0<br>137   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese  | ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base  | current<br>55<br>0<br>99<br><1  | history1<br>76<br>0<br>137<br>0  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm                                    | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | current<br>55<br>0<br>99<br><1<br>107   | history1<br>76<br>0<br>137<br>0<br>256   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                             | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base  | current           55           0           99           <1           107           2035   | history1<br>76<br>0<br>137<br>0<br>256<br>1894   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                      | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base  | Current<br>55<br>0<br>99<br><1<br>107<br>2035<br>848  | history1<br>76<br>0<br>137<br>0<br>256<br>1894<br>975  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm               | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | current           55           0           99           <1           107           2035           848           1118  | history1<br>76<br>0<br>137<br>0<br>256<br>1894<br>975<br>1170  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm               | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   |   | Current 55 0 99 <1 107 2035 848 1118 3493   | history1<br>76<br>0<br>137<br>0<br>256<br>1894<br>975<br>1170<br>4002  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm               | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | current           55           0           99           <1           107           2035           848           1118           3493           current   | history1<br>76<br>0<br>137<br>0<br>256<br>1894<br>975<br>1170<br>4002<br>history1  | <br><br><br><br>history2   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base<br>>25   | current           55           0           99           <1           107           2035           848           1118           3493           current           6   | history1           76           0           137           0           256           1894           975           1170           4002           history1           7  | <br><br><br><br>history2   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | method           ASTM D5185m   | limit/base<br>>25   | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5   | history1           76           0           137           0           256           1894           975           1170           4002           history1           7           5  | <br><br><br><br><br><br>history2   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | method           ASTM D5185m   | limit/base<br>>25<br>>20  | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5           <1  | history1           76           0           137           0           256           1894           975           1170           4002           history1           7           5           2  | <br><br><br><br><br>history2<br><br>                                     |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED                                     | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | method           ASTM D5185m   | limit/base<br>>25<br>>20<br>limit/base<br>>3                      | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5           <1           current  | history1         76         0         137         0         256         1894         975         1170         4002         history1         7         5         2         history1   | <br><br><br><br><br>history2<br><br><br>history2                         |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %                           | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | method           ASTM D5185m   | limit/base<br>>25<br>>20<br>limit/base<br>>3                      | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5           <1           current           0.2  | history1         76         0         137         0         256         1894         975         1170         4002         history1         7         5         2         history1         0         0.2                                   | <br><br><br><br>history2<br><br>history2<br><br>history2                 |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration              | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | method           ASTM D5185m   | limit/base<br>>25<br>>20<br>limit/base<br>>3<br>>20               | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5           <1           current           0.2           9.3                                  | history1           76           0           137           0           256           1894           975           1170           4002           history1           7           5           2           history1           0.2           9.1 | <br><br><br><br><br><br>history2<br><br>history2<br><br>history2         |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | method           ASTM D5185m           ASTM D5185m | Imit/base >25 >20 Imit/base >3 >20 >3 >20 >30                     | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5           <1           current           0.2           9.3           19.1                   | history1         76         0         137         0         256         1894         975         1170         4002         history1         7         5         2         history1         0.2         9.1         18.9                    | <br><br><br><br><br><br>history2<br><br>history2<br><br>history2<br>     |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINANTS<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | method           ASTM D5185m           ASTM D7844           *ASTM D7624           *ASTM D7415           method                             | limit/base<br>>25<br>>20<br>limit/base<br>>3<br>>20<br>>30<br>>30 | current           55           0           99           <1           107           2035           848           1118           3493           current           6           5           <1           current           0.2           9.3           19.1           current | history1         76         0         137         0         256         1894         975         1170         4002         history1         7         5         2         history1         0.2         9.1         18.9         history1   | <br><br><br><br><br><br>history2<br><br><br>history2<br><br><br>history2 |



# **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       | NONE        | 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 PROPERT          | IES       | method  | limit/base | current     | history1 | history2 |
| Visc @ 100°C           | cSt       | ASTM D445   |            | 12.5        | 12.4     |          |
| GRAPHS                 |           |   |            |             |          |          |
| 0ct9/23                |           |   | Nov2023    |             |          |          |
| Non-ferrous Metal      | s         |   |            |             |          |          |
| copper<br>lead         |           |   |            |             |          |          |
| 069/23                 | ********* | 94 8 10 10 20 20 20 20 20 20 20 20 20 20 20 20 20 | iov20/23   |             |          |          |
| ്<br>Viscosity @ 100°C |           |   | 7.0        | Base Number |          |          |

(B/HO)

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0.0

0ct9/23

Nov20/23 -

: 22 Nov 2023

: 23 Nov 2023



Unique Number : 10753877 Diagnostician : Wes Davis Test Package : CONST (Additional Tests: TBN) Contact: NICK DIXON Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. NICK.DIXON@DUKELAZZAM.COM \* - 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)

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

Received

Diagnosed

16

13

12

11

Laboratory Sample No.

Lab Number

0ct9/23

: WC0828498

: 06014733

cSt (100°C)

Vov20/23

F:

DUKE LAZZARA

T: (919)760-7797

RALEIGH, NC

US 27603

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