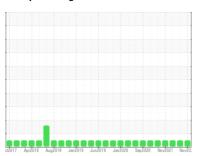


## **OIL ANALYSIS REPORT**

#### **Sample Rating Trend**







# MACK TK 25

Component

Diesel Engine

PETRO CANADA DURON HP 15W40 (34 QTS)

## 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**

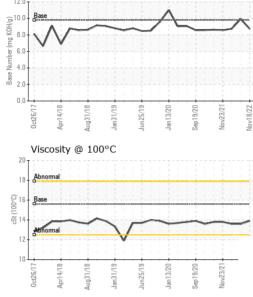
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| SAMPLE INFORI  | MATION   | method   | limit/base  | current   | history1  | history2  |
|--|--|--|---|---|---|---|
| Sample Number  |  | Client Info  |   | PCA0071916  | PCA0072131  | PCA0059698  |
| Sample Date  |  | Client Info  |   | 18 Nov 2022   | 15 Sep 2022   | 19 Feb 2022   |
| Machine Age  | mls  | Client Info  |   | 162761  | 154961  | 147047  |
| Oil Age  | mls  | Client Info  |   | 7800  | 7914  | 0   |
| Oil Changed  |  | Client Info  |   | Changed   | Changed   | Changed   |
| Sample Status  |  |  |   | NORMAL  | NORMAL  | NORMAL  |
| CONTAMINAT   | ION  | method   | limit/base  | current   | history1  | history2  |
| Fuel   |  | WC Method  | >5  | <1.0  | <1.0  | <1.0  |
| Glycol   |  | WC Method  |   | NEG   | NEG   | NEG   |
| WEAR METAL   | S  | method   | limit/base  | current   | history1  | history2  |
| Iron   | ppm  | ASTM D5185m  | >120  | 4   | 5   | 5   |
| Chromium   | ppm  | ASTM D5185m  | >20   | 0   | <1  | <1  |
| Nickel   | ppm  | ASTM D5185m  | >5  | 0   | 0   | <1  |
| Titanium   | ppm  | ASTM D5185m  | >2  | 0   | <1  | <1  |
| Silver   | ppm  | ASTM D5185m  | >2  | <1  | <1  | <1  |
| Aluminum   | ppm  | ASTM D5185m  | >20   | 2   | 2   | 1   |
| Lead   | ppm  | ASTM D5185m  | >40   | 0   | 0   | <1  |
| Copper   | ppm  | ASTM D5185m  | >330  | 2   | 2   | 2   |
| Tin  | ppm  | ASTM D5185m  | >15   | 0   | <1  | <1  |
| Antimony   | ppm  | ASTM D5185m  |   |   |   |   |
| Vanadium   | ppm  | ASTM D5185m  |   | 0   | <1  | 0   |
| Cadmium  | ppm  | ASTM D5185m  |   | 0   | 0   | 0   |
|  |  |  |   |   |   |   |
| ADDITIVES  |  | method   | limit/base  | current   | history1  | history2  |
| ADDITIVES<br>Boron   | ppm  | method<br>ASTM D5185m  | limit/base  | current<br>0  | history1  | history2  |
|  | ppm<br>ppm   |  | limit/base  |   |   | · ·   |
| Boron  |  | ASTM D5185m  | limit/base  | 0   | 8   | 10  |
| Boron<br>Barium  | ppm  | ASTM D5185m<br>ASTM D5185m   | limit/base  | 0<br>0  | 8   | 10  |
| Boron<br>Barium<br>Molybdenum  | ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | 0<br>0<br>62  | 8<br>0<br>56  | 10<br>0<br>60   |
| Boron<br>Barium<br>Molybdenum<br>Manganese   | ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base  | 0<br>0<br>62<br><1  | 8<br>0<br>56<br>1   | 10<br>0<br>60<br><1   |
| Boron Barium Molybdenum Manganese Magnesium  | ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | 0<br>0<br>62<br><1<br>921   | 8<br>0<br>56<br>1<br>927  | 10<br>0<br>60<br><1<br>957  |
| Boron Barium Molybdenum Manganese Magnesium Calcium  | ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base  | 0<br>0<br>62<br><1<br>921<br>1114   | 8<br>0<br>56<br>1<br>927<br>1248  | 10<br>0<br>60<br><1<br>957<br>1087  |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus   | ppm<br>ppm<br>ppm<br>ppm<br>ppm                                    | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base  | 0<br>0<br>62<br><1<br>921<br>1114<br>1012   | 8<br>0<br>56<br>1<br>927<br>1248<br>1014  | 10<br>0<br>60<br><1<br>957<br>1087<br>961   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                      | 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  | 0<br>0<br>62<br><1<br>921<br>1114<br>1012   | 8<br>0<br>56<br>1<br>927<br>1248<br>1014  | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040                                     |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                      | 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  |   | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593                           | 8<br>0<br>56<br>1<br>927<br>1248<br>1014<br>1287<br>3601                            | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040<br>2536                             |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm               | ASTM D5185m  | limit/base  | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current                | 8<br>0<br>56<br>1<br>927<br>1248<br>1014<br>1287<br>3601<br>history1                | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040<br>2536<br>history2                 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS  | ASTM D5185m  | limit/base  | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current                | 8<br>0<br>56<br>1<br>927<br>1248<br>1014<br>1287<br>3601<br>history1                | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040<br>2536<br>history2                 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  | limit/base  | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current<br>4           | 8<br>0<br>56<br>1<br>927<br>1248<br>1014<br>1287<br>3601<br>history1<br>4           | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040<br>2536<br>history2<br>4            |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  | limit/base >25 >20                                      | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current<br>4<br>0      | 8<br>0<br>56<br>1<br>927<br>1248<br>1014<br>1287<br>3601<br>history1<br>4<br>2      | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040<br>2536<br>history2<br>4<br>2<br><1 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  | limit/base >25 >20 limit/base                           | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current<br>4<br>0<br>0 | 8<br>0<br>56<br>1<br>927<br>1248<br>1014<br>1287<br>3601<br>history1<br>4<br>2<br>0 | 10<br>0<br>60<br><1<br>957<br>1087<br>961<br>1040<br>2536<br>history2<br>4<br>2<br><1 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %                                  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  Method  *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m  | limit/base >25 >20 limit/base >4                        | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current<br>4<br>0<br>0 | 8 0 56 1 927 1248 1014 1287 3601 history1 4 2 0 history1 0.2                        | 10 0 60 <1 957 1087 961 1040 2536 history2 4 2 <1 history2 0.1                        |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration                        | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  Method  ASTM D5185m  Method  *ASTM D7844  *ASTM D7624  *ASTM D76145           | limit/base >25 >20 limit/base >4 >20                    | 0<br>0<br>62<br><1<br>921<br>1114<br>1012<br>1218<br>3593<br>current<br>4<br>0<br>0 | 8 0 56 1 927 1248 1014 1287 3601 history1 4 2 0 history1 0.2 6.9                    | 10 0 60 <1 957 1087 961 1040 2536 history2 4 2 <1 history2 0.1 6.5                    |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation              | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185m  Method  ASTM D5185m  Method  *ASTM D7844  *ASTM D7624  *ASTM D76145           | limit/base >25 >20 limit/base >4 >20 >30                | 0 0 62 <1 921 1114 1012 1218 3593 current 4 0 0 current 0.2 7.6 20.6                | 8 0 56 1 927 1248 1014 1287 3601 history1 4 2 0 history1 0.2 6.9 19.5               | 10 0 60 <1 957 1087 961 1040 2536 history2 4 2 <1 history2 0.1 6.5 17.7               |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE | ppm                            | ASTM D5185m  METHOD  ASTM D5185m  METHOD  *ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  METHOD  *ASTM D7844  *ASTM D7624  *ASTM D7415  METHOD | limit/base >25 >20 limit/base >4 >20 >30 limit/base >25 | 0 0 62 <1 921 1114 1012 1218 3593 current 4 0 0 current 0.2 7.6 20.6 current        | 8 0 56 1 927 1248 1014 1287 3601 history1 4 2 0 history1 0.2 6.9 19.5 history1      | 10 0 60 <1 957 1087 961 1040 2536 history2 4 2 <1 history2 0.1 6.5 17.7 history2      |



Base Number

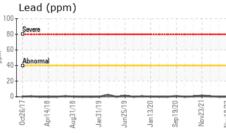
## **OIL ANALYSIS REPORT**

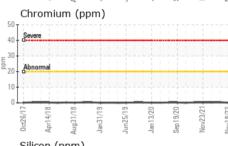


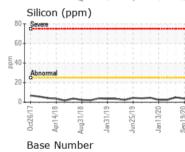
| VISUAL                  |        | method  | limit/base       | current | history1        | history2 |
|-------------------------|--------|---------|------------------|---------|-----------------|----------|
| White Metal             | scalar | *Visual | NONE             | NONE    | NONE            | NONE     |
| Yellow Metal            | scalar | *Visual | NONE             | NONE    | NONE            | NONE     |
| Precipitate             | scalar | *Visual | NONE             | NONE    | NONE            | NONE     |
| Silt                    | scalar | *Visual | NONE             | NONE    | NONE            | NONE     |
| Debris                  | scalar | *Visual | NONE             | NONE    | NONE            | NONE     |
| Sand/Dirt               | scalar | *Visual | NONE             | NONE    | NONE            | NONE     |
| Appearance              | scalar | *Visual | NORML            | NORML   | NORML           | NORML    |
| Odor                    | scalar | *Visual | NORML            | NORML   | NORML           | NORML    |
| <b>Emulsified Water</b> | scalar | *Visual | >0.2             | NEG     | NEG             | NEG      |
| Free Water              | scalar | *Visual |                  | NEG     | NEG             | NEG      |
|                         | DTIEO  | l       | Para St. /leanna |         | for the control | h'atam 0 |

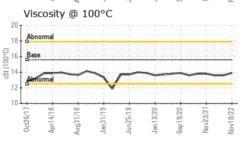
| FLUID FNOF   | EULIES | memod     |      |      | HISTOLAL | HISTOLYZ |
|--------------|--------|-----------|------|------|----------|----------|
| Visc @ 100°C | cSt    | ASTM D445 | 15.6 | 13.9 | 13.6     | 13.6     |

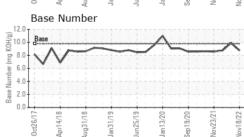
|                           | n (pp        | m)       |          |          |           |            |            |          | Lead (pp                             |
|---------------------------|--------------|----------|----------|----------|-----------|------------|------------|----------|--------------------------------------|
| 250 Sev                   | vere         |          |          |          |           |            |            |          | Severe                               |
| 200                       |              |          |          |          |           |            |            |          | E 60                                 |
| E 150                     | normal       |          | -        |          |           |            |            |          | Abnormal                             |
| 50                        |              |          |          |          |           |            |            |          | 20-                                  |
| مليا ه                    | <del>-</del> |          | -        | -        | +++       | -          | +++        | 2        | 0                                    |
| Oct26/1                   | Apr14/18     | Aug31/18 | Jan31/19 | Jun25/19 | Jan 13/20 | Sep19/20   | Nov23/2    | Nov18/22 | Oct26/17<br>Apr14/18                 |
| Λlı                       |              |          |          |          |           |            |            |          |                                      |
| AIL                       | uminu        | m (p     | om)      |          |           |            |            |          | Chromiu                              |
| 50 Sev                    |              | m (p     | om)      | -1       |           | 7          |            |          | 50 7 7 - 7 - 7 - 7 - 7               |
| EU                        |              | m (pi    | om)      |          |           |            |            |          |                                      |
| 50 Sev<br>40              |              | m (p     | om)      |          |           |            |            |          | 50<br>40 Severe                      |
| 50 Sev<br>40              |              | m (pr    | om)      |          |           |            |            |          | 50<br>40 Severe                      |
| 50 Sev<br>40              | vere         | m (pr    | om)      |          |           | 1 1        |            |          | 50<br>40 Severe                      |
| 50   Sev<br>40   30   Abr | normal       |          |          |          |           |            |            | -        | 50   Severe   30   Abnormal   10   0 |
| 30 Ab                     | vere         | Aug31/18 | om)      | Jun25/19 | Jan 13/20 | Sep19/20 - | Nov23/21+) | Nov18/22 | 40 Severe 30 Abnormal                |













Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** Test Package : MOB 2

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0071916 : 05705155

Copper (ppm)

400

E 200 100

: 10234729

Received : 30 Nov 2022 : 01 Dec 2022 Diagnosed Diagnostician : Wes Davis

To discuss this sample report, contact Customer Service at 1-800-237-1369. \* - 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)

J F PRICE 611 PLEASANT ST E WEYMOUTH, MA

US 02189 Contact: JOHN LANG gnalj1970@comcast.net

Submitted By: JOHN LANG

T: (617)435-7199 F: (781)337-4150