



OIL ANALYSIS REPORT

| | |
|-----------------|---------------|
| WEAR | NORMAL |
| CONTAMINATION | NORMAL |
| FLUID CONDITION | NORMAL |



Machine Id
TEL2211 (S/N Main Engine)
Component
Main Engine
Fluid
PETRO CANADA RALUBE 40 CFS (1100 LTR)

RECOMMENDATION

Resample at the next service interval to monitor.

| Test | UOM | Method | Limit/Abn | Current | History1 | History2 |
|----------------|-----|-------------|-----------|--------------------|-------------|-------------|
| Sample Number | | Client Info | | WC0439021 | WC0439024 | WC0344524 |
| Sample Date | | Client Info | | 04 Sep 2020 | 15 Jun 2020 | 14 Apr 2020 |
| Machine Age | hrs | Client Info | | 162560 | 161376 | 160953 |
| Oil Age | hrs | Client Info | | 1178 | 0 | 0 |
| Filter Age | hrs | Client Info | | 1178 | 0 | 0 |
| Oil Changed | | Client Info | | Changed | Not Changd | N/A |
| Filter Changed | | Client Info | | Changed | Not Changd | N/A |
| Sample Status | | | | NORMAL | NORMAL | NORMAL |

WEAR

All component wear rates are normal.

| | | | | | | |
|----------|-----|---------------|-----|--------------|----|----|
| Iron | ppm | ASTM D5185(m) | >75 | 5 | 5 | 5 |
| Chromium | ppm | ASTM D5185(m) | >8 | <1 | <1 | <1 |
| Nickel | ppm | ASTM D5185(m) | >2 | 0 | 0 | 0 |
| Titanium | ppm | ASTM D5185(m) | >3 | 0 | <1 | <1 |
| Silver | ppm | ASTM D5185(m) | >2 | 0 | 0 | 0 |
| Aluminum | ppm | ASTM D5185(m) | >15 | 1 | 1 | 1 |
| Lead | ppm | ASTM D5185(m) | >18 | 0 | 0 | 0 |
| Copper | ppm | ASTM D5185(m) | >80 | <1 | <1 | <1 |
| Tin | ppm | ASTM D5185(m) | >14 | 0 | 0 | 0 |
| Vanadium | ppm | ASTM D5185(m) | | <1 | 0 | <1 |

CONTAMINATION

There is no indication of any contamination in the oil.

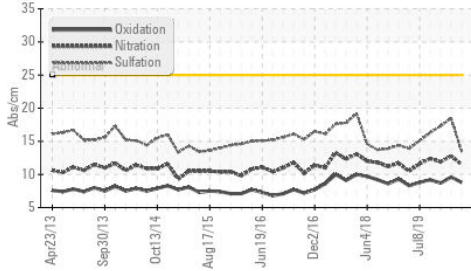
| | | | | | | |
|------------------|----------|---------------|------|----------------|------|------|
| Silicon | ppm | ASTM D5185(m) | >20 | <1 | 4 | 7 |
| Potassium | ppm | ASTM D5185(m) | >20 | 2 | 2 | 2 |
| Fuel | | WC Method | >4.0 | <1.0 | <1.0 | <1.0 |
| Water | | WC Method | >0.1 | NEG | NEG | NEG |
| Glycol | | WC Method | | NEG | NEG | NEG |
| Soot % | % | ASTM D7844* | | 0.5 | 0.2 | 0.2 |
| Nitration | Abs/cm | ASTM D7624* | >20 | 11.5 | 12.8 | 11.9 |
| Sulfation | Abs/.1mm | ASTM D7415* | >30 | 13.5 | 18.5 | 17.3 |
| Emulsified Water | scalar | Visual* | >0.1 | NEG | NEG | NEG |

FLUID CONDITION

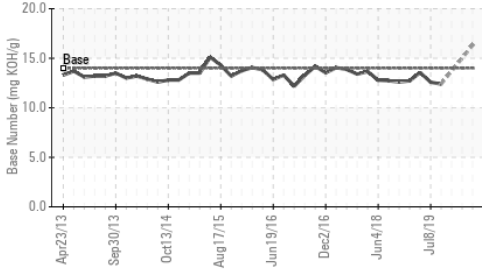
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| | | | | | | |
|------------------|----------|---------------|------|--------------|------|------|
| Sodium | ppm | ASTM D5185(m) | >75 | 2 | 9 | 11 |
| Boron | ppm | ASTM D5185(m) | 0 | <1 | 2 | 2 |
| Barium | ppm | ASTM D5185(m) | 0 | <1 | <1 | <1 |
| Molybdenum | ppm | ASTM D5185(m) | 0 | <1 | <1 | <1 |
| Manganese | ppm | ASTM D5185(m) | 0 | <1 | <1 | <1 |
| Magnesium | ppm | ASTM D5185(m) | 25 | 21 | 23 | 25 |
| Calcium | ppm | ASTM D5185(m) | 4300 | 4441 | 4438 | 4409 |
| Phosphorus | ppm | ASTM D5185(m) | 1.6 | 6 | 7 | 7 |
| Zinc | ppm | ASTM D5185(m) | 2 | 8 | 11 | 11 |
| Sulfur | ppm | ASTM D5185(m) | 1500 | 982 | 1120 | 1167 |
| Oxidation | Abs/.1mm | ASTM D7414* | >25 | 8.8 | 9.6 | 8.7 |
| Base Number (BN) | mg KOH/g | ASTM D2896* | 14.0 | 16.30 | --- | --- |
| Visc @ 100°C | cSt | ASTM D7279(m) | 14.8 | 15.1 | 14.8 | 14.7 |

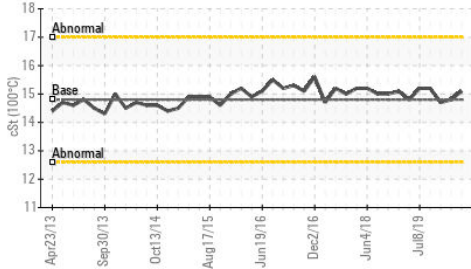
FT-IR (Direct Trend)



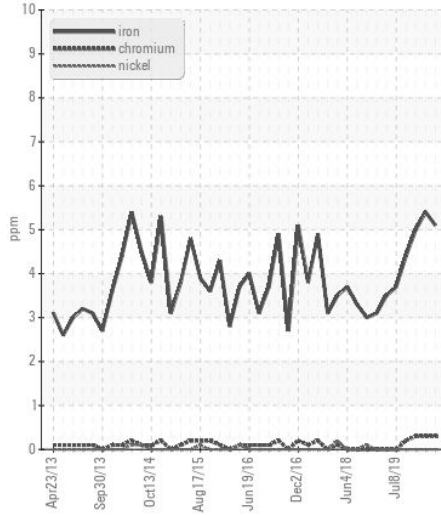
Base Number



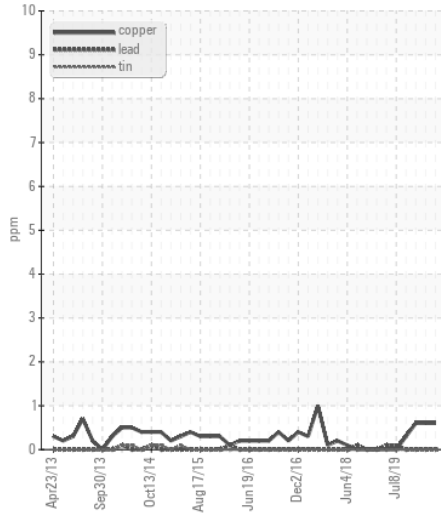
Viscosity @ 100°C



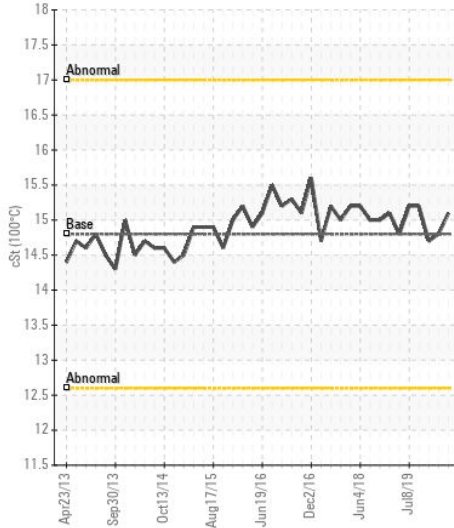
Ferrous Alloys



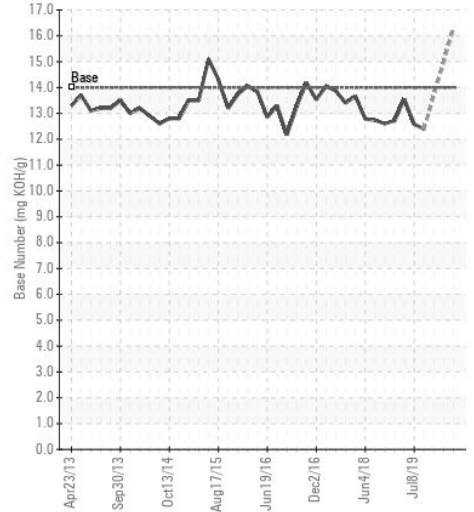
Non-ferrous Metals



Viscosity @ 100°C



Base Number



ISO 17025:2017
Accredited
Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9

Sample No. : WC0439021

Lab Number : 02375255

Unique Number : 5098703

Test Package : MAR 2

Received : 11 Sep 2020

Tested : 14 Sep 2020

Diagnosed : 14 Sep 2020 - Wes Davis

CANADIAN COAST GUARD

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To discuss this sample report, contact Customer Service at 1-800-268-2131.

Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.

Validity of results and interpretation are based on the sample and information as supplied.