Maxxam
A Bureau Veritas Group Company

Success Through Science®

# LIQUID HYDROCARBON ANALYSIS

| MaxxID | Client ID | Meter Number | Laboratory Number |
|---|---|---|---|
| TOREA01C | | | B8B0313:UZ1720-01 |

| Operator Name | LSD | Well ID |
|---|---|---|
| TOURMALINE OIL CORP | 15-10-085-20-W6M | 100/14-15-085-21W6/00 |

| Well/Plant/Facility | Initials of Sampler | Sampling Company |
|---|---|---|
| TOURMALINE RED CREEK 14-15-085-21W6 | IG | HALTECH TESTING |

| Field or Area | Pool or Zone | Sample Point | Container Identity | Percent Full |
|---|---|---|---|---|
| RED CREEK | MONTNEY | DUMPLINE @ 15-10 | 17886,20705 | |

| Test Recovery | Sample Gathering Point | Solution Gas |
|---|---|---|
| | Other(Miscellaneous) | |

| Test Type | No. | Multiple Recovery | Interval | Elevations (m) KB | Elevations (m) GRD | Well Fluid Status | Well Status Mode |
|---|---|---|---|---|---|---|---|
| | | | From: 1840.67 To: 3403.17 | 724.3 | 718.6 | Gas | |

| Production Rates Water m³/d | Production Rates Oil m³/d | Production Rates Gas 1000m³/d | Gauge Pressures kPa Source | Gauge Pressures kPa As Received | Temperature °C Source | Temperature °C As Received | Well Status Type | Well Type |
|---|---|---|---|---|---|---|---|---|
| 231.1 | 47.3 | 76.6 | 345 | 524 | 33 | 21 | | |

| Gas or Condensate Project | Licence No. |
|---|---|
| | |

| Date Sampled Start | Date Sampled End | Date Received | Date Reported | Date Reissued | Analyst |
|---|---|---|---|---|---|
| 2018/12/18 06:30 | | 2018/12/19 | 2018/12/21 | | CB,HB2 |

## COMPOSITION

| COMPONENT | MOLE FRACTION* | MASS FRACTION | VOLUME FRACTION |
|---|---|---|---|
| $N_2$ | 0.0001 | Trace | Trace |
| $CO_2$ | 0.0001 | Trace | Trace |
| $H_2S$ | 0.0000 | 0.0000 | 0.0000 |
| $C_1$ | 0.0167 | 0.0018 | 0.0048 |
| $C_2$ | 0.0163 | 0.0033 | 0.0073 |
| $C_3$ | 0.0341 | 0.0103 | 0.0160 |
| $IC_4$ | 0.0113 | 0.0045 | 0.0062 |
| $NC_4$ | 0.0414 | 0.0164 | 0.0222 |
| $IC_5$ | 0.0223 | 0.0110 | 0.0139 |
| $NC_5$ | 0.0387 | 0.0191 | 0.0238 |
| $C_6$ | 0.0655 | 0.0385 | 0.0458 |
| $C_7$+ | 0.7535 | 0.8951 | 0.8600 |
| TOTAL | 1.0000 | 1.0000 | 1.0000 |

## PROPERTIES

Saturation pressure of this sample meets acceptable criteria: TRUE

| RESIDUE | RELATIVE DENSITY @ 15 °C OBSERVED | RELATIVE DENSITY @ 15 °C CALCULATED | RELATIVE MOLECULAR MASS OBSERVED | RELATIVE MOLECULAR MASS CALCULATED | DATA SUMMARY MOLE FRACTION | DATA SUMMARY MASS FRACTION | DATA SUMMARY VOLUME FRACTION |
|---|---|---|---|---|---|---|---|
| C5+ | | 0.806 | | 160 | 0.8800 | 0.9637 | 0.9435 |
| C6+ | | 0.813 | | 167 | 0.8190 | 0.9336 | 0.9058 |
| C7+ | 0.821 | | 208 | 174 | 0.7535 | 0.8951 | 0.8600 |
| C10+ | | | | | 0.4234 | 0.6508 | 0.6047 |
| C12+ | | | | | 0.3067 | 0.5339 | 0.4853 |
| TOTAL | | 0.789 | | 147 | | | |

| | |
|---|---|
| Calculated Absolute Density Total Sample: | 788.3 kg/m3 @ 15 °C |
| Gas Equivalent Factor: | 108.92 m3 Gas/m3 Liquid |
| Saturation Pressure(Lab): | 455 kPa @ 21.2 °C |

***per Method ASTM D2887-M and/or GPA 2261-M**

**** Information not supplied by Client -- data derived from LSD information**

**Results relate only to items tested**

*Remarks:*

**The gas and condensate analyses do not match theoretical separation coefficients for the reported temperature and pressure.**

Reference Method suffix "M" indicates test methods incorporate validated modifications from specific reference methods to improve performance.



Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

# LIQUID HYDROCARBON ANALYSIS

TOURMALINE OIL CORP — *Operator Name*
B8B0313:UZ1720-01 — *Laboratory Number*

TOURMALINE RED CREEK 14-15-085-21W6 — *Well Name*
DUMPLINE @ 15-10 — *Sample Point*

HALTECH TESTING — *Sampling Company*
TOREA01C — *MaxxID*
*Client ID*

2018/12/18 06:30 — *Date Sampled Start*
*Date Sampled End*
2018/12/19 — *Date Received*
2018/12/21 — *Date Reported*
*Date Reissued*
CB,HB2 — *Analyst*

| COMPONENT | BOILING POINT (°C) | MOLE FRACTION | MASS FRACTION | VOLUME FRACTION |
|---|---|---|---|---|
| Nitrogen | -196 | 0.0001 | Trace | Trace |
| Carbon Dioxide | -79 | 0.0001 | Trace | Trace |
| Hydrogen Sulphide | -60 | 0.0000 | 0.0000 | 0.0000 |
| Methane | -162 | 0.0167 | 0.0018 | 0.0048 |
| Ethane | -89 | 0.0163 | 0.0033 | 0.0073 |
| Propane | -42 | 0.0341 | 0.0103 | 0.0160 |
| Iso-Butane | -12 | 0.0113 | 0.0045 | 0.0062 |
| n-Butane | 0 | 0.0414 | 0.0164 | 0.0222 |
| Iso-Pentane | 28 | 0.0223 | 0.0110 | 0.0139 |
| n-Pentane | 36 | 0.0387 | 0.0191 | 0.0238 |
| Hexanes | 37-69 | 0.0655 | 0.0385 | 0.0458 |
| Heptanes | 70-98 | 0.1107 | 0.0714 | 0.0763 |
| Octanes | 99-126 | 0.1251 | 0.0933 | 0.0976 |
| Nonanes | 127-151 | 0.0943 | 0.0796 | 0.0814 |
| Decanes | 152-174 | 0.0700 | 0.0671 | 0.0685 |
| Undecanes | 175-196 | 0.0467 | 0.0498 | 0.0509 |
| Dodecanes | 197-216 | 0.0340 | 0.0395 | 0.0399 |
| Tridecanes | 217-236 | 0.0368 | 0.0464 | 0.0464 |
| Tetradecanes | 237-253 | 0.0277 | 0.0375 | 0.0372 |
| Pentadecanes | 254-271 | 0.0239 | 0.0346 | 0.0340 |
| Hexadecanes | 272-287 | 0.0201 | 0.0305 | 0.0274 |
| Heptadecanes | 288-302 | 0.0230 | 0.0372 | 0.0332 |
| Octadecanes | 303-317 | 0.0192 | 0.0329 | 0.0291 |
| NonaDecanes | 318-331 | 0.0123 | 0.0221 | 0.0194 |
| Eicosanes | 332-343 | 0.0113 | 0.0210 | 0.0183 |
| Heneicosanes | 344-357 | 0.0108 | 0.0215 | 0.0187 |
| Docosanes | 358-369 | 0.0101 | 0.0208 | 0.0212 |
| Triacosanes | 370-380 | 0.0100 | 0.0211 | 0.0181 |
| Tetracosanes | 381-391 | 0.0091 | 0.0200 | 0.0171 |
| Pentacosanes | 392-402 | 0.0072 | 0.0164 | 0.0140 |
| Hexacosanes | 403-412 | 0.0066 | 0.0155 | 0.0132 |
| Heptacosanes | 413-422 | 0.0059 | 0.0145 | 0.0124 |
| Octacosanes | 423-432 | 0.0053 | 0.0134 | 0.0113 |
| Nonacosanes | 433-441 | 0.0051 | 0.0133 | 0.0111 |
| Triacontanes+ | 442-449+ | 0.0283 | 0.0757 | 0.0633 |
| Totals | | 1.0000 | 1.0000 | 1.0000 |
| neoHexane | 50 | 0.0000 | 0.0000 | 0.0000 |
| Methylcyclopentane | 70 | 0.0163 | 0.0094 | 0.0095 |
| Benzene | 80 | 0.0037 | 0.0019 | 0.0016 |
| Cyclohexane | 81 | 0.0176 | 0.0101 | 0.0098 |
| Methylcyclohexane | 101 | 0.0313 | 0.0210 | 0.0207 |
| Toluene | 111 | 0.0089 | 0.0057 | 0.0049 |
| Ethylbenzene | 136 | 0.0022 | 0.0016 | 0.0014 |
| m&p-Xylene | 139 | 0.0122 | 0.0088 | 0.0077 |
| o-Xylene | 144 | 0.0051 | 0.0037 | 0.0032 |
| 1,2,4-Trimethylbenzene | 169 | 0.0066 | 0.0054 | 0.0046 |

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# LIQUID HYDROCARBON ANALYSIS

| | | | |
|---|---|---|---|
| TOREA01C | | | B8B0313:UZ1720-01 |
| MaxxID | Client ID | Meter Number | Laboratory Number |
| TOURMALINE OIL CORP | | 15-10-085-20-W6M | 100/14-15-085-21W6/00 |
| Operator Name | | LSD | Well ID |
| TOURMALINE RED CREEK 14-15-085-21W6 | | IG | HALTECH TESTING |
| Well/Plant/Facility | | Initials of Sampler | Sampling Company |
| RED CREEK | MONTNEY | DUMPLINE @ 15-10 | 17886,20705 |
| Field or Area | Pool or Zone | Sample Point | Container Identity |

Percent Full

Test Recovery: Other(Miscellaneous) — Sample Gathering Point

Solution Gas

Test Type | No. | Multiple Recovery

Interval: From: 1840.67 To: 3403.17

Elevations (m): 724.3 KB, 718.6 GRD

Gas — Well Fluid Status

Well Status Mode

Production Rates: 231.1 Water m³/d, 47.3 Oil m³/d, 76.6 Gas 1000m³/d

Gauge Pressures kPa: 345 Source, 524 As Received

Temperature °C: 33 Source, 21 As Received

Well Status Type

Well Type

Gas or Condensate Project

Licence No.

| Date Sampled Start | Date Sampled End | Date Received | Date Reported | Date Reissued | Analyst |
|---|---|---|---|---|---|
| 2018/12/18 06:30 | | 2018/12/19 | 2018/12/21 | | CB,HB2 |

| PARAMETER DESCRIPTION | Result | Unit | Method | MDL |
|---|---|---|---|---|
| **Physical Properties** | | | | |
| Manual Cloud Point | +15 | °C | ASTM D2500 | |

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