# Tech Data

PETRO-CANADA LUBRICANTS

# CALFLO™ Synthetic Heat Transfer Fluid

## Introduction

Petro-Canada CALFLO™ Synthetic is a synthetic heat transfer fluid specifically formulated for extremely cold climates where ambient temperatures can reach -48°C (-54°F). CALFLO Synthetic's unique chemistry is based on a synthetic poly-alpha-olefin base oil and specially selected additives that deliver outstanding protection while remaining virtually free of impurities and aromatic compounds that can be hazardous to workplace health and safety.

The result is CALFLO Synthetic, a heat transfer fluid that provides high thermal stability and excellent cold temperature pumpability in extreme start-up operating conditions as low as -48°C (-54°F). CALFLO Synthetic's breakthrough chemistry balances low temperature fluidity with outstanding oxidative stability and volatility control.

## Applications

Petro-Canada CALFLO Synthetic is recommended for use in non-pressurized, liquid phase, closed heat transfer systems operating continuously at moderate bulk temperatures. CALFLO Synthetic's low viscosity ensures outstanding heat transfer efficiency even at moderate operating temperatures while its low temperature fluidity ensures excellent pumpability under extreme conditions, eliminating the need for expensive heat tracing and insulation in outdoor applications with ambient temperatures down to -48°C (-54°F).

## Features and Benefits

- **High thermal and oxidative stability can help to extend fluid life and lower operating costs.**
  - Thermal stressing of a heat transfer fluid can cause the formation of light molecular compounds. These compounds can:
    - raise a fluid's vapour pressure, which can cause fluid leakage from control valves and pipe flanges, circulating pump cavitation and vapour locking
    - dramatically reduce a fluid's auto-ignition temperature, the lowest temperature that a fluid will combust, without flame or spark, in the presence of oxygen
    - lower the operating temperature at which the heat transfer system can safely operate
    - necessitate a costly, premature fluid change-out
  - A fluid's resistance to oxidative breakdown is critical in heat transfer systems where exposure to air is likely or can not be avoided. Strong oxidative resistance can significantly extend fluid life, and may provide operational savings by reducing fluid change-out frequency and down time.
  - High resistance to oxidative thickening.

    As a fluid oxidizes, it becomes more viscous. This increase in viscosity can:
    - significantly reduce a fluid's thermal efficiency
    - make the fluid more difficult to circulate through the heat transfer system
    - result in overheating of the fluid
    - necessitate a costly, premature fluid change-out

**What is the HT difference?**

Petro-Canada Lubricants starts with the HT purity process to produce water-white, 99.9% pure base oils. The result is a range of lubricants, specialty fluids and greases that deliver maximum performance for our customers.

MAXIMUM PERFORMANCE • PERFORMANCE MAXIMALE • HT TM/MC

- **Natural lubricity extends operational savings.**
  - CALFLO Synthetic's natural lubricating properties can also help to reduce maintenance costs by extending the service life of circulating pumps and other rotating parts.
  - Shipments and storage of CALFLO Synthetic do not normally require special safety permits. Empty drums used to transport CALFLO Synthetic are readily accepted by drum re-conditioners. In addition, used CALFLO Synthetic may be responsibly disposed in the following ways**:
    - through re-sale to used oil recycling companies
    - in some jurisdictions, combined with BTU recovery systems

## Operational Considerations

While CALFLO Synthetic's excellent low temperature pumpability allows cold system start-up in extreme temperatures as low as -48°C (-54°F), parameters for systems operating continuously below 5°C (41°F) should be reviewed with Petro-Canada to determine the suitability of the fluid in its specific operating environment.

CALFLO Synthetic is specially formulated to provide long service life under normal operating conditions. However, actual fluid life is dependent upon system design and operating practice. Special precautions should be taken to avoid operating conditions that can shorten fluid life. These include:

- thermal shocking resulting from accelerated system temperature increases
- thermal shocking from hot spots on a system's heating coils

While CALFLO Synthetic is highly resistant to oxidative breakdown, excessive air and water contamination can reduce thermal efficiency and shorten fluid life. Petro-Canada recommends inert gas blanketing of a system's expansion tank to guard against exposure to air and water and the need to change-out the fluid prematurely.

Although CALFLO Synthetic has been formulated for high resistance to contamination from air and water, contamination with process chemicals or deteriorated residual fluids can shorten fluid life. To maximize system efficiency and fluid life, Petro-Canada highly recommends system cleaning and flushing to remove all contaminants, sludge and varnish prior to recharging a system with CALFLO Synthetic.

**Before conducting any transport and disposal practice check to ensure that it is in compliance with federal, state, provincial and/or local laws and regulations.

## Thermal Data

| PROPERTY | TEMPERATURE | |
|---|---|---|
| | 15°C (59°F) | 38°C (100°F) |
| Density, kg/L (lb/ft$^3$) | 0.799 (49.9) | 0.784 (48.9) |
| Thermal Conductivity, W/m K (BTU/hr.°F ft)*** | 0.152 (0.088) | 0.15 (0.087) |
| Heat Capacity, kJ/kg K (BTU/lb. °F)*** | 2.28 (0.55) | 2.30 (0.55) |
| Vapour Pressure, kPa (psia)*** | 0.00 (0.00) | 0.00 (0.00) |

*** Estimated

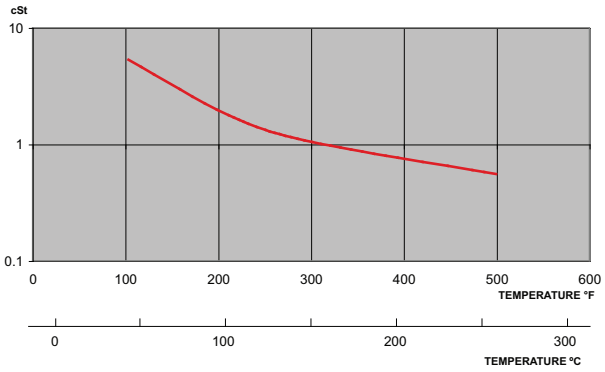
**For detailed heat transfer calculations please refer to our ENGINEERING ASSISTANT calculator which is available at no cost from your Petro-Canada Technical Services representative.**

## Typical Performance Data

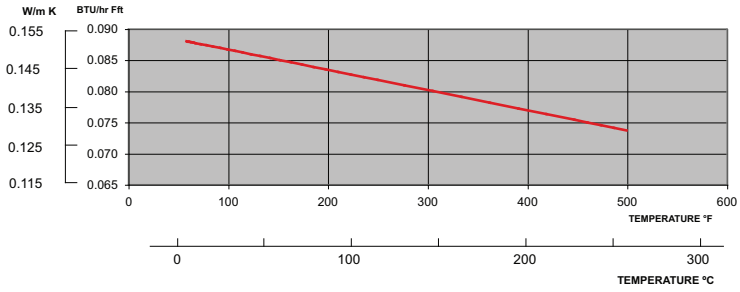
| PROPERTY | TEST METHOD | RESULTS |
|---|---|---|
| Colour | ASTM D1500 | <0.5 |
| Weight/US gal at 260°C (500°F), lbs | | 5.3 |
| Pour Point, °C (°F) | ASTM D5950 | < -57°C (< -71°F) |
| Flash Point, COC, °C (°F) | ASTM D92 | 163 (325) |
| Fire Point, COC, °C (°F) | ASTM D92 | 173 (343) |
| Auto-ignition Temperature, °C (°F) | ASTM E659 | 320 (608) |
| Viscosity, cSt at 40°C (104°F)<br>cSt at 100°C (212°F)<br>cSt at 260°C (500°F) | ASTM D445 | 5.25<br>1.75<br>0.55 |
| Average Molecular Weight | | 264.6 |
| Neutralization Value, TAN, mg KOH/g | ASTM D664 | <0.1 |
| Sulfur by XRF, wt% | ASTM D4294 | <0.001 |
| Distillation Range, °C (°F)<br>10%<br>50%<br>90% | ASTM D7213 | <br>320 (608)<br>329 (624)<br>337 (639) |
| Coefficient of Thermal Expansion, %/°C (%/°F) | | 0.1117 (0.0621) |

The values quoted above are typical of normal production. They do not constitute a specification.

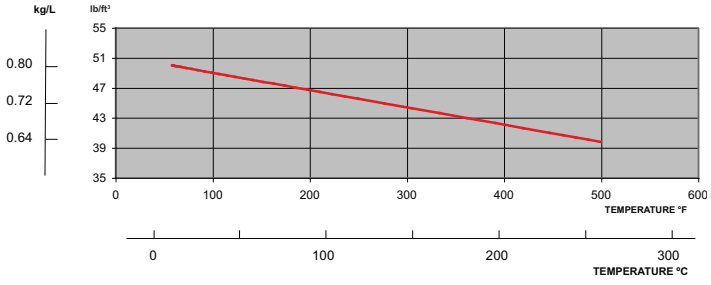
## CALFLO Synthetic VISCOSITY



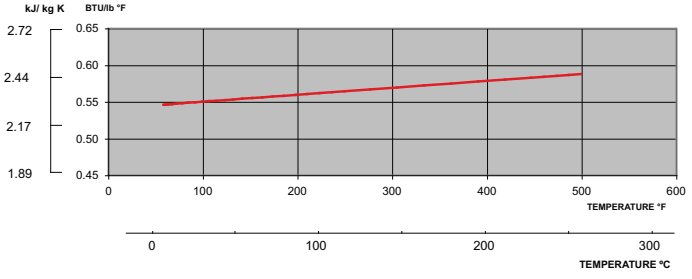

## CALFLO Synthetic THERMAL CONDUCTIVITY***




## CALFLO Synthetic DENSITY




## CALFLO Synthetic HEAT CAPACITY***




*** Estimated

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ISO 9001
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IM-8052E (2017.05)



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