Tech Data

PETRO-CANADA LUBRICANTS

CALFLO™ LT Synthetic Blend Heat Transfer Fluid

Introduction

Petro-Canada CALFLO™ LT is a synthetic blend heat transfer fluid, suitable for use over a wide range of operating temperatures, and formulated to lower operating costs by reducing the frequency of fluid change outs.

CALFLO LT's unique chemistry starts with a blend of synthetic poly-alpha-olefins, and Petro-Canada's 99.9% pure, synthetic VHVI base fluids produced from an HT purity process. These crystal-clear fluids are free of impurities and aromatic compounds that can be hazardous to workplace health and safety. Utilizing more than 25 years of formulating experience, Petro-Canada fortifies these thermally stable base fluids with specially selected additives to provide stronger resistance to oxidative breakdown than competitive synthetic fluids.

The result is CALFLO LT, a heat transfer fluid that provides high thermal efficiency in systems operating up to 288°C (550°F) and excellent cold temperature pumpability in start-up operating conditions as low as -40°C (-40°F). CALFLO LT's breakthrough chemistry can extend fluid life longer than leading competitive fluids, lowering operating costs by reducing the frequency of fluid change-outs.

Applications

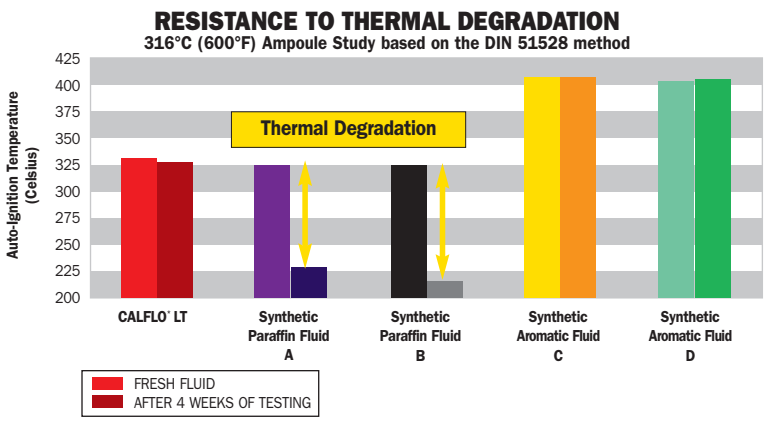
Petro-Canada CALFLO LT is recommended for use in non-pressurized, liquid phase, closed heat transfer systems operating continuously at bulk temperatures up to 288°C (550°F). Yet, CALFLO LT's low viscosity ensures outstanding heat transfer efficiency even at moderate operating temperatures. Its low temperature fluidity ensures good pumpability under extreme conditions, eliminating the need for expensive heat tracing and insulation in outdoor applications with ambient temperatures down to -40°C (-40°F).

Features and Benefits

- **Higher thermal and oxidative stability than leading competitors can extend fluid life and lower operating costs.**
  - More thermally stable than leading synthetic paraffin based fluids.

    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

In ampoule studies conducted at 316°C (600°F), CALFLO LT and two synthetic aromatic competitive fluids remained thermally stable and maintained their auto-ignition temperature throughout a four week test, while two synthetic paraffin based fluids underwent significant thermal degradation resulting in dramatic drops in their auto-ignition temperatures:



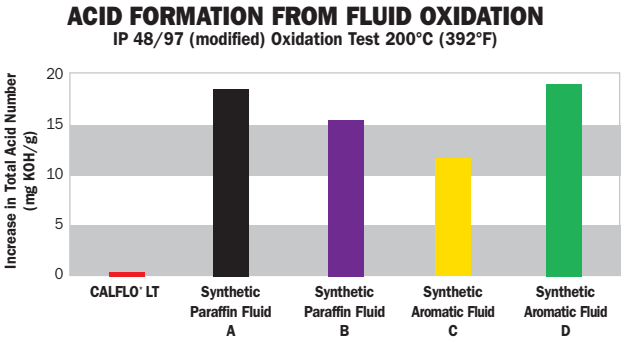
What is the HT difference?

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.

- More resistant to oxidative breakdown than leading competitive fluids.

  A fluid's resistance to oxidative breakdown is critical in heat transfer systems where exposure to air is likely or cannot be avoided. Strong oxidative resistance can significantly extend fluid life, providing operational savings by reducing fluid change-out frequency and down time.

The formation of acids within a fluid is indicative of oxidation. In a severe oxidation test, CALFLO LT demonstrates almost no signs of fluid oxidation while synthetic paraffin and synthetic aromatic fluids experience significant oxidation:

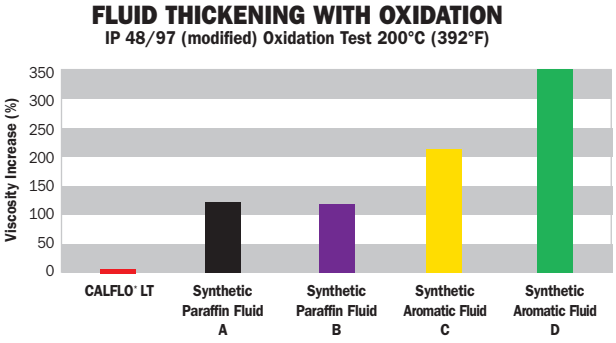


- Higher resistance to oxidative thickening versus leading competitive fluids.

  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

In a severe oxidation stability test, CALFLO LT demonstrates virtually no increase in fluid viscosity, while synthetic paraffin and synthetic aromatic fluids experienced significant oxidative viscosity increases:



- **Low vapour pressure can save on top-up costs while improving workplace safety.**
  - CALFLO LT's low vapour pressure can reduce or eliminate fluid leakage from control valves and pipe flanges.
  - Reduction or elimination of leaks provides a cleaner and safer operating environment, and results in operational savings by reducing the need for cleaning, maintenance and fluid top-up.
- **Natural lubricity extends operational savings.**
  - CALFLO LT's natural lubricating properties can also reduce maintenance costs by extending the service life of circulating pumps and other rotating parts.
  - CALFLO LT does NOT require special handling.
  - Shipments and storage of CALFO LT do not normally require special safety permits. Empty drums used to transport CALFLO LT are readily accepted by drum re-conditioners. In addition, used CALFLO LT may be responsibly disposed in the following ways**:
    - through re-sale to used oil recycling companies
    - in jurisdictions, combined with BTU recovery systems

**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.

Operational Considerations

While CALFLO LT's excellent low temperature pumpability allows cold system start-up in ambient temperatures as low as -40°C (-40°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 LT is specially formulated to provide long service life under normal operating conditions up to its maximum recommended temperature. 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
- continuously running above the maximum recommended operating temperature

While CALFLO LT 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 LT 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 LT.

Thermal Data

PROPERTY	TEMPERATURE		
	15°C (59°F)	38°C (100°F)	260°C (500°F)
Density, kg/L (lb/ft^3)	0.819 (51.1)	0.804 (50.2)	0.658 (41.1)
Thermal Conductivity, W/m K (BTU/hr.°F·Ft)	0.141 (0.082)	0.139 (0.081)	0.121 (0.070)
Heat Capacity, kJ/kg K (BTU/lb. °F)	2.07 (0.49)	2.15 (0.51)	2.91 (0.70)
Vapour Pressure, kPa (psia)	0.00 (0.00)	0.00 (0.00)	28.8 (4.18)

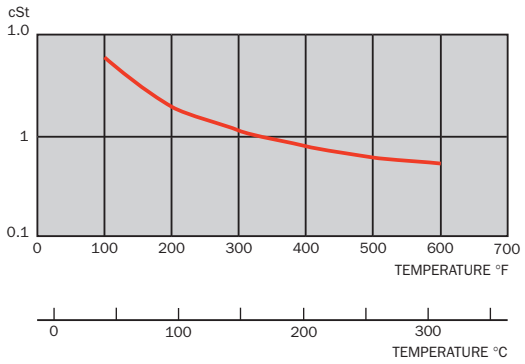
For detailed heat transfer calculations please refer to our ENGINEERING ASSISTANT calculator which is available at no cost from your Petro-Canada Technical Services representative.

Typical Performance Data

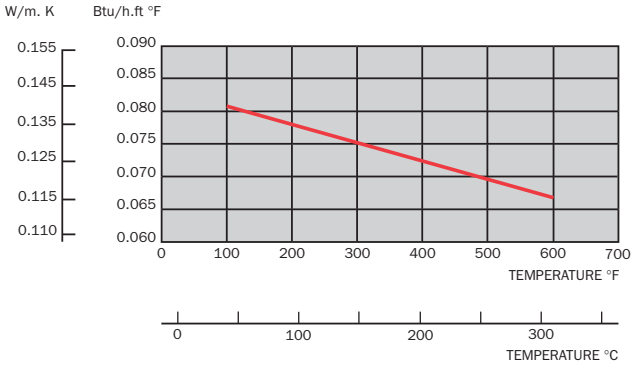
PROPERTY	TEST METHOD	RESULTS
Colour	ASTM D1500	<0.5
Weight/US gal at 260°C (500°F), lbs		5.4
Pour Point, °C (°F)	ASTM D5950	< -57°C (< -71°F)
Flash Point, COC, °C (°F)	ASTM D92	176 (349)
Fire Point, COC, °C (°F)	ASTM D92	189 (372)
Auto-ignition Temperature, °C (°F)	ASTM E659	323 (613)
Viscosity, cSt at 40°C (104°F) cSt at 100°C (212°F) cSt at 260°C (500°F)	ASTM D445	7.5 2.2 0.6
Average Molecular Weight		278
Neutralization Value, TAN, mg KOH/g	ASTM D664	<0.1
Sulfur by XRF, wt%	ASTM D4294	<0.0001
Distillation Range, °C (°F) 10% 50% 90%	ASTM D7213	 318 (604) 338 (640) 390 (734)
Coefficient of Thermal Expansion, %/°C (%/°F)		0.1057 (0.0587)

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

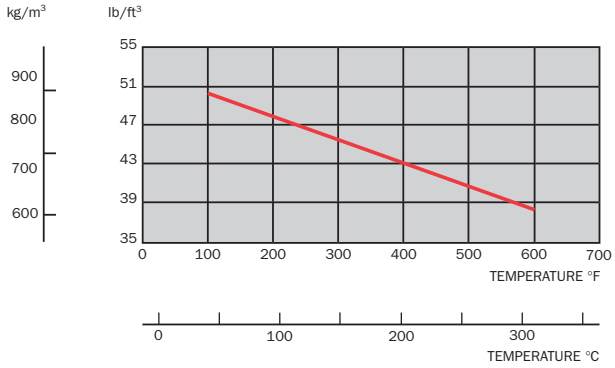
CALFLO LT VISCOSITY



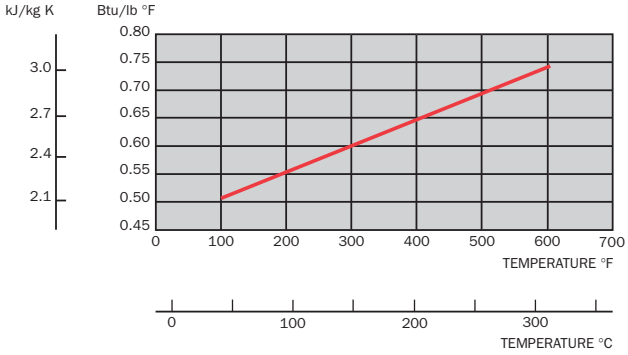
CALFLO LT THERMAL CONDUCTIVITY



CALFLO LT DENSITY



CALFLO LT HEAT CAPACITY



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or contact us at: **lubecsr@petrocanadalsp.com**

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ISO 9001
ISO 14001
ISO/TS 16949

IM-7874E (2017.07)

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