# Tech Data

PETRO-CANADA LUBRICANTS

# PRODURO™ TO-4+ Synthetic and Synthetic Blend Transmission/Drive Train Oil (TDTO)

## Introduction

PRODURO™ TO-4+ Synthetic All Season and XL Synthetic Blend Lo Temp are high quality, premium performance multi-grade fluids designed to maximize durability and equipment protection in severe winter and summer conditions. Seasonal change-outs for hydraulics[5], wet brakes, drive trains and transmissions can be eliminated without compromising the lubricant performance with PRODURO TO-4+ Synthetic All Season. Moreover, component wear, attributable to both cold start-up conditions and high operating temperatures, can be reduced.

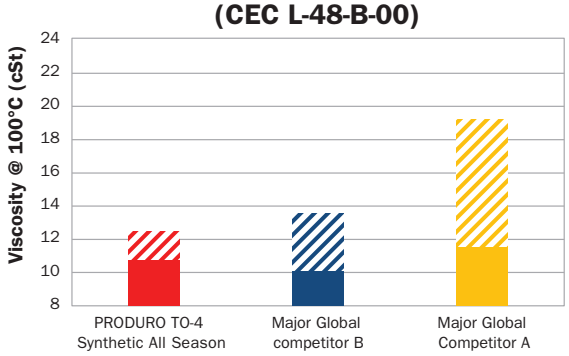
PRODURO TO-4+ Synthetic All Season and Synthetic Blend Lo Temp offers multi-grade performance with excellent shear stability, standing up to the toughest operating conditions for mobile equipment. The 99.9% pure synthetic base oils combined with high performance additives deliver outstanding equipment protection and longer oil life. Drain intervals can be extended to reduce total maintenance costs.

## Features and Benefits

The following demonstrates how PRODURO TO-4+ Synthetic All Season and XL Synthetic Blend Lo Temp can help increase productivity and decrease operating costs:

- **High viscosity index ensures consistent performance over a wide temperature range**
  - Extended component life through better lubricant protection
  - Fewer cold start-up problems and reduced wear
  - Better protection of wet brakes and hydraulic components at elevated operating temperatures versus TO-4 10W oils
- **Year-round use provides increased efficiencies**
  - May eliminate seasonal oil changes for the Synthetic All Season
  - Extends oil drains

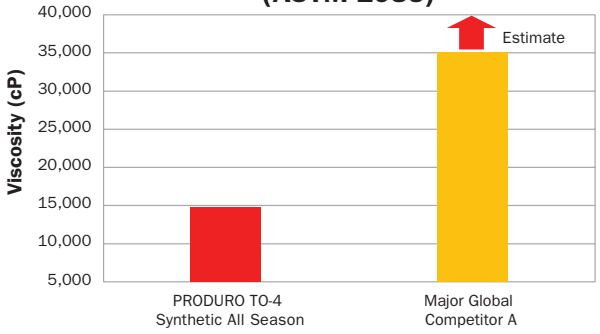
**TO-4 Multi-grade**
**DKA Oxidation 160°C, 192 hrs,**
**Viscosity, cSt Fresh and after Testing**
**(CEC L-48-B-00)**




Solid bars are Fresh Oil viscosity @ 100°C
Hash marked bars are viscosities @ 100°C after the CEC L-48-B-00 testing

  - May allow for product consolidation which results in reduced handling costs for Synthetic All Season

**Low Temperature Performance**
**TO-4 Multi-grade**
**Brookfield Viscosity, cP @ -35°C**
**(ASTM 2983)**




The lower the Viscosity the better the low temperature performance.

  - Less downtime and better performance during the four seasons

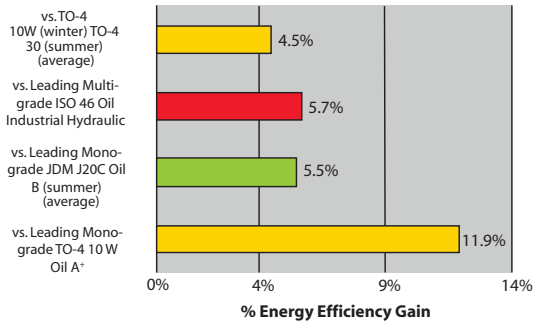
**What is the HT difference?**

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

- **Premium additive package ensures peak performance**
  - Carefully balanced lubricity and frictional properties optimize the operation of powershift clutches and wet brakes, eliminating brake chatter and clutch wear
  - Minimal deposit build-up on clutch and transmission components
  - Outstanding anti-wear protection for hydraulic pumps and transmission systems[1] versus TO-4 10W oils
- **Extremely high after shear VI for increased pump efficiency in outdoor applications**
  - Lower energy consumption for same amount of work or increased equipment productivity

**PRODURO TO-4+ Synthetic All Season % Energy Efficiency Gain vs. Competitive Hydraulic Oils**




**PRODURO TO-4+ All Season provides better energy efficiency vs. competitive hydraulic oils, given the same amount of work.**

Comparison based on Denison T6CM pump - B10 cartridge, 2000 rpm, 200 bar, 70ºC (158ºF) and 90ºC (194ºF)

## Applications

PRODURO™ TO-4+ Synthetic All Season and XL Synthetic Blend Lo Temp is intended for use in Caterpillar off-highway vehicles and any mobile equipment where conventional motor oils are accepted in hydraulics, transmissions, gears and wet brake applications. It is formulated to meet the Caterpillar TO-4 specification, Allison C-4 fluid requirements (obsolete), API Gear Lubricant Service GL-3 for manual transmissions and spiral bevel gears (inactive), API Category CD (obsolete) for diesel engine oils, Komatsu's KES 07.868.1, ZF transmission oil specification TE-ML 03C (Syn All Season Only) and KOMATSU micro-clutch usage.

PRODURO TO-4+ Synthetic All Season and XL Synthetic Blend Lo Temp transmission/drive train oils are recommended for the following Caterpillar or Komatsu vehicle systems:

- Powershift and Hydrostatic Transmissions[1]
- Wet Brake Mechanisms
- Differentials and Final Drives
- Hydraulics

PRODURO™ TO-4+ Synthetic All Season is viscometrically equivalent to SAE 5W-30. It may be recommended for product consolidation of 10W and 30 single grades, reduced energy usage, and extend drain intervals versus conventional TO-4 products.

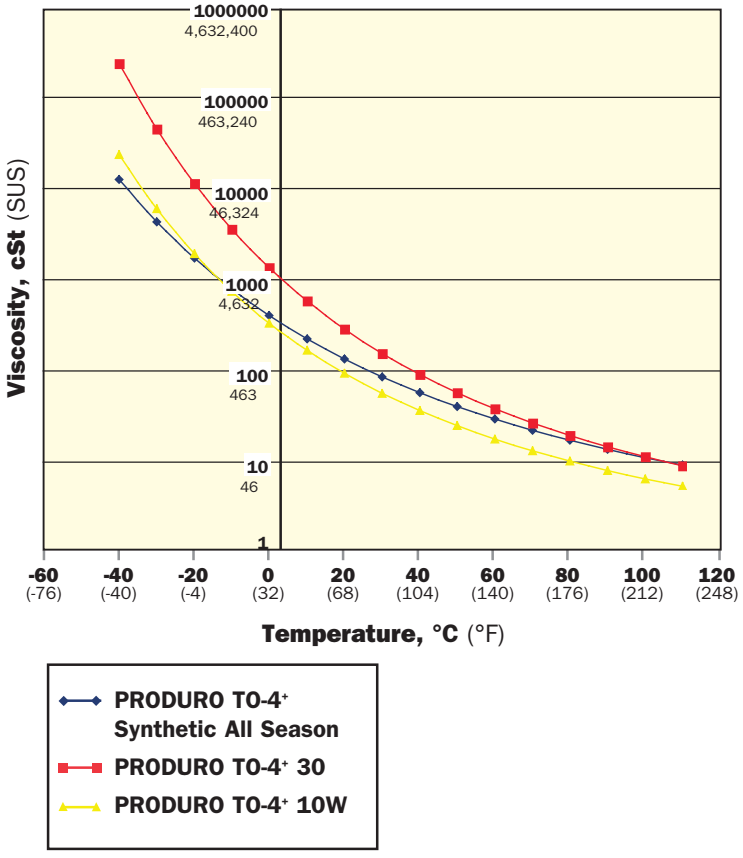
PRODURO TO-4+ XL Synthetic Blend Lo Temp is a multi-grade SAE 0W-20 TO-4 fluid for use at colder ambient temperatures. The exceptional low temperature flow characteristics of PRODURO TO-4+ XL Synthetic Blend Lo Temp provide effective lubrication at temperatures down to -45°C / -49°F.

For components requiring a Caterpillar FD-1 oil, Petro-Canada recommends the PRODURO FD-1 product line. Consult the latest SEBU 6250 for applicable applications.

## Viscosity-Temperature Relationship

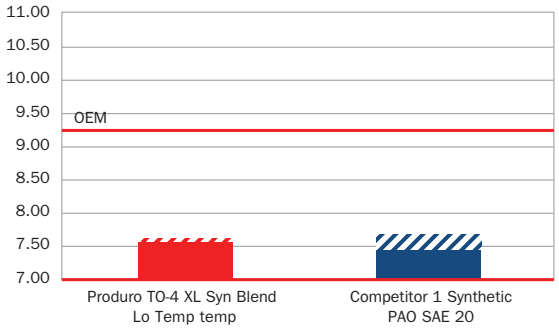
Over a wide temperature change, the viscosity-temperature relationship demonstrates the advanced capability of the PRODURO TO-4+ Synthetic All Season at both very low and high temperatures versus SAE 10W and SAE 30 grades.

**Viscosity-Temperature Relationship**



### PRODURO™ TO-4 XL Synthetic Blend Low temp vs. Global Competitor PAO/Synthetic based SAE 20 ASTM D445

Kinematic Viscosity @ 100°C Fresh and after DKA Oxidation testing (CEC L-48-B-00) 160°C/192 hrs

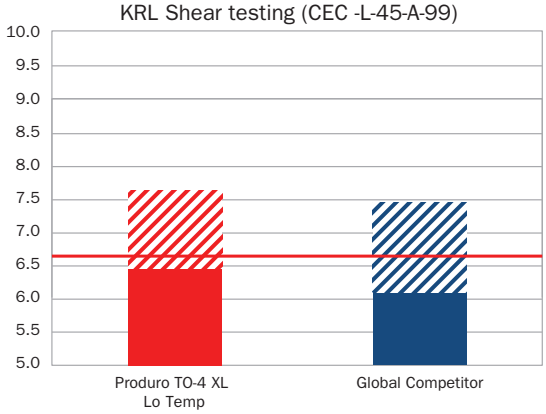



Solid bars are Fresh Oil viscosity @ 100°C
Hash marked bars are viscosities @ 100°C after CEC L-48-B-00 testing


When the sludge and varnish bulid up are compared against the Competitor 1 PAO based synthetic product, PRODURO TO-4 XL Syn Blend Low temp performs as well as Competitor while maintaining cost at a more effective level.

### PRODURO TO-4 XL Synthetic Blend Low Temp Viscosity

Kinematic Viscosity @ 100°C Before and After 20 hr KRL Shear testing (CEC -L-45-A-99)




After an aggressive lab shear test (20 hr/KRL), PRODURO TO-4 XL Syn Blend Lo temp's Viscosity@100°C are higher than this Competitor's PAO based product for a better high temperature film thickness protection.

## Grade Selection

| APPLICATION | PRODURO TO-4+ | |
|---|---|---|
| | XL LO TEMP[4] °C (°F) | SYNTHETIC ALL SEASON °C (°F) |
| [1]Powershift Transmissions | -43 (-45) to +10 (+50) | -34 (-29) to +30 (+86) |
| [1]Hydrostatic Transmissions | -43 (-45) to +40 (+104) | -34 (-29) to +45 (+113) |
| [2]Final Drive On-Highway | -47 (-53) to 0 (+32) | -37 (-35) to +25 (+77) |
| [3]Final Drive Off-Highway | -47 (-53) to 0 (+32) | -37 (-35) to +15 (+59) |
| [5] Hydraulics | -43 (-45) to +40 (+104) | -34 (-29) to +50 (+122) |
| [4]Output Transfer Gears | -40 (-40) to -10 (+14) | -37 (-35) to +35 (+95) |
| Powershift Transmissions (797) | N/A | -34 (-29) to +30 (+86) |
| Hydraulic Systems (M Series Motor Graders) | -43 (-45) to +40 (+104) | -18 (0) to +25 (+77) |
| Track Roller Fram Recoil Spring/Pivot Shaft Bearing | -43 (-45) to +0 (+32) | -37 (-35) to +25 (+77) |
| [4]Drive Axles (Small/Med) | -45 (-49) to +0 (+32) | -37 (-35) to +30 (+86) |
| Drive Axles (Large) | -45 (-49) to -10 (+14) | -37 (-35) to +15°C (+59) |
| Starting Engine Transmissions | -45 (-49) to +40 (+104) | -37 (-35) to +20 (+68) |
| Variable Pitch Fans | N/A | -34 (-29) to +20 (+68) |
| [4]Backhoe Loaders (Rear Axles) | N/A | -37 (-35) to +30 (+86) |

Note:
[1]Powershift and Hydrostatic transmissions applications may need higher viscosity fluids for added film thickness protection if used in continuous operation or under extreme heavy loading. Refer to SEBU 6250 (Most Recent) for further details.
[2]Wheeled vehicles (e.g. tractors, loaders, skidders).
[3]Tracked vehicles (e.g. tractors, pipelayers, skidders and loaders).
[4]Refer to "Caterpillar Machine Fluids Recommendations" - SEBU 6250 (Most Recent) for more specific information.
[5]Refer to "Caterpillar Machine Fluids Recommendations" service publication SEBU 6250 (Most Recent) for more specific information.

## Typical Performance Data

| PROPERTY | TEST METHOD | PRODURO™ TO-4+ | |
|---|---|---|---|
| | | XL Lo Temp | SYNTHETIC ALL SEASON |
| Density @ 15°C, kg/l | D4052 | 0.852 | 0.860 (7.16) |
| Flash Point, °C (°F) | D92 | 209 (408) | 222 (432) |
| Viscosity cSt @ 40°C (SUS @ 100°F)<br>cSt @ 100°C (SUS @ 210°F) | D445 | 35.1 (177.8)<br>7.40 (50.9) | 55.8 (132.4)<br>10.74 (51.3) |
| Viscosity Index | D2270 | 184 | 187 |
| Brookfield Viscosity, cP @ °C (°F) | D2983 | 10,140 @ -40 (-40) | 14,720 @ -35 (-31) |
| Cold Cranking Viscosity, cP @ °C (°F) | D5293 | 4,403 @ -35 (-31) | 6,530 @ -30 (-22) |
| Borderline Pumping Viscosity cP @ °C (°F) | D4684 | 12,875 @ -40 (-40) | 16,135 @ -35 (-31) |
| Pour Point,°C (°F) | D5950 | -51 (-60) | -48 (-54) |
| Zinc, % wt | D4951 | 0.12 | 0.13 |
| Calcium, % wt | D4951 | 0.30 | 0.31 |
| Phosphorus, % wt | D4951 | 0.11 | 0.11 |
| Sulfated Ash | D874 | 1.2 | 1.2 |
| Foaming 1<br>2<br>3 | D892 | 0/0<br>40/0<br>0/0 | 0/0<br>20/0<br>10/0 |
| TBN | D2896 | 7.70 | 7.86 |

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

To order product or to learn more about how Petro-Canada Lubricants can help your business visit: **lubricants.petro-canada.com**
or contact us at: **lubecsr@petrocanadalsp.com**

CERTIFIED
ISO 9001
ISO 14001
ISO/TS 16949

IM-7960E (2019.03)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