



LUBRICANTS

AN HF SINCLAIR BRAND

TECH DATA

PRODURO™ TO-4+ TRANSMISSION/DRIVE TRAIN OILS (TDTO)

INTRODUCTION

PRODURO™ TO-4+ Oils are premium heavy duty transmission/drive train oils designed to meet the Caterpillar TO-4 lubricant specification. These exceptional formulations maximize the life of the frictional materials in Caterpillar powershift transmissions, eliminate the chatter in wet brake mechanisms and protect drive train gears against wear. The PRODURO product line is specially formulated with ultra-pure, high quality base oils and high performance additives.

PRODURO TO-4+ is available in the following viscosity grades: SAE 10W, SAE 30, SAE 50, and SAE 60.

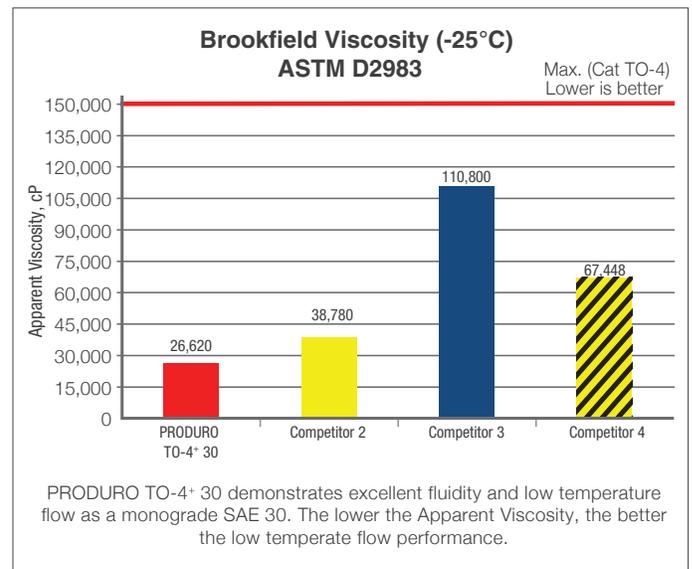
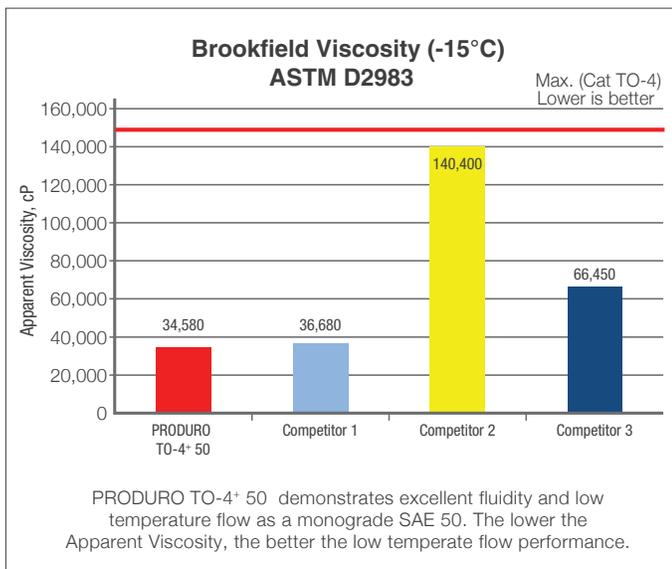
Some of these PRODURO TO-4+ grades go beyond traditional TO-4 fluids as they can meet multi-grade specifications. Because they provide reliable performance over a wider range of temperatures, components will operate under optimal viscosity longer, resulting in better protection and less wear.

PRODURO TO-4+ SAE	ALSO SUITABLE FOR CAT TO-4
10W	5W
30	15W
50	–
60	–

FEATURES AND BENEFITS

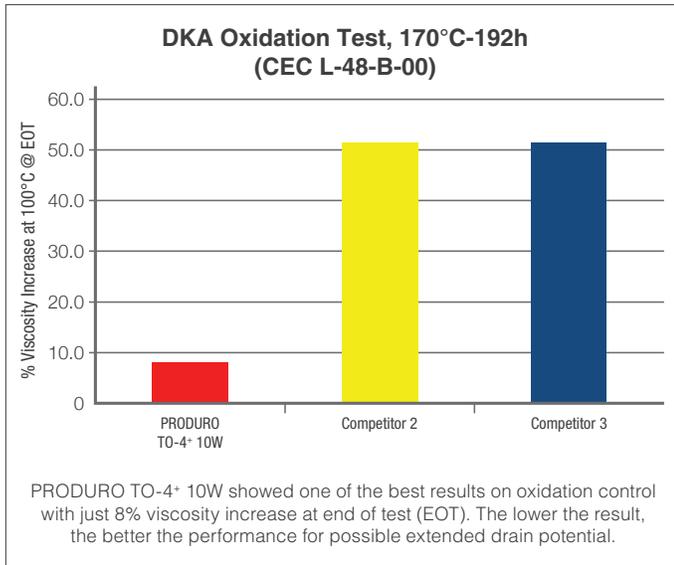
Better Protection

- Multigrade performance provides wider ambient and operating temperature ranges for optimal viscosity to better prevent wear



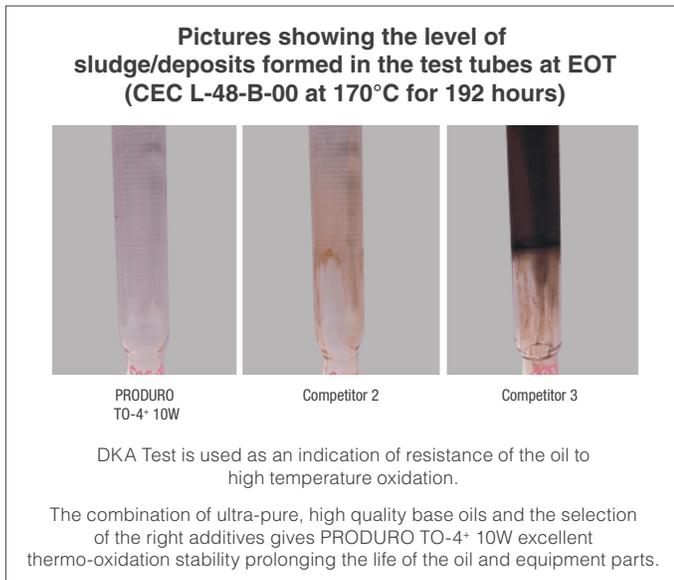
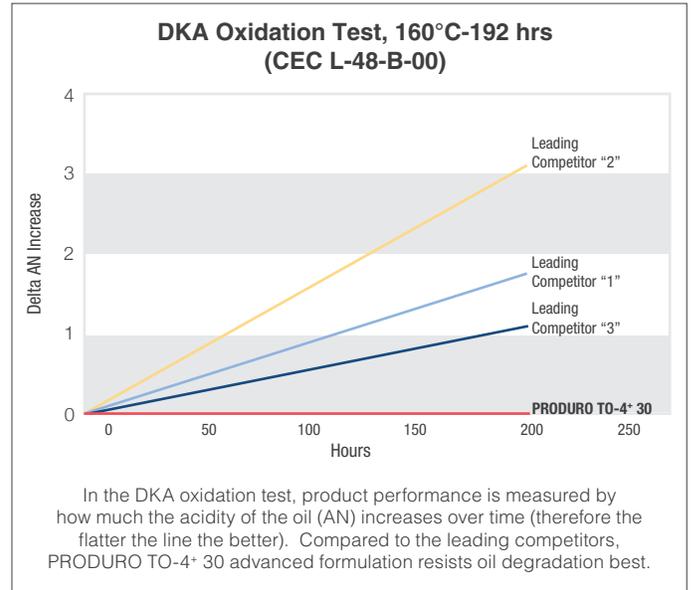
Petro-Canada lubricants, specialty fluids and greases have an advantage in quality and performance. That's because our formulas are created and reviewed by an expert team of Research & Development specialists who ensure our finished products deliver to the specifications we demand and the performance standards our customers need.

- Outstanding resistance to oil breakdown. Extends component life by minimizing deposit build-up and keeping fresh oil properties for extended periods of time.
- Leading edge formulations significantly improves wear properties over oils in transmissions and gears



Longer Oil Life

- Outstanding resistance to oil degradation due to the advanced formulations that contains ultra-pure, high quality base oils



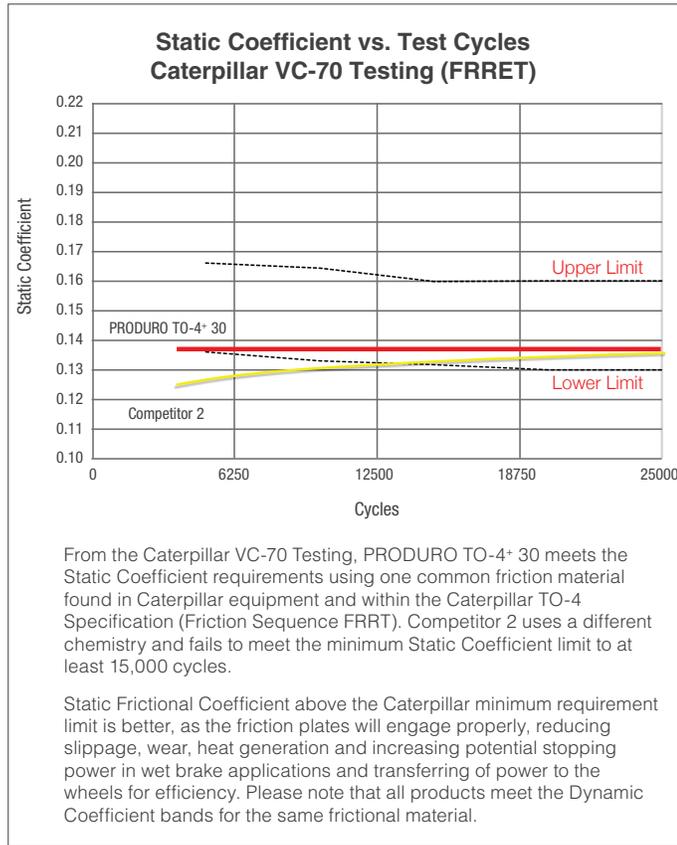
Smoother Operation

- Oil formulation carefully balances lubricity and functional properties
- Operation of powershift clutches and wet brake mechanisms optimized
- Minimizes clutch plate wear and brake chatter

- Minimizes wear in high pressure hydraulic pump systems

Lower Operational Costs

- Reduces maintenance costs
- Increases reliability
- Increases equipment availability



APPLICATIONS

PRODURO™ TO-4+ transmission/drive train oils (TDTO) are designed for use in Caterpillar off-highway vehicles. They are formulated to meet the Caterpillar TO-4 specification, Caterpillar TO-2 (obsolete), API GL-3 for Gear (inactive), Allison C-4 for Transmission (obsolete), API CD for Diesel Engine (obsolete) and Eaton/Vickers (M-2950/I-280-S).

PRODURO TO-4+ Oils are recommended for use in hydraulics, manual transmissions and drive lines where a TO-4 oil is recommended. Other OEM's specifications include Komatsu's KES 07.868.1 and ZF's TE-ML 03C (SAE 10W-and SAE 30) and TE-ML 07F (SAE 30) classification.

PRODURO TO-4+ (30, 50 and 60 grades) are suitable for use in Eaton manual transmissions under the standard drain category as quoted in Eaton TCM T0021EN-US.

PRODURO TO-4+ (TDTO) Fluids are recommended for the following Caterpillar vehicle systems:

- Powershift and Hydrostatic Transmissions⁴
- Wet Brake Mechanisms
- Differentials and Final Drives
- Hydraulics

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

GRADE SELECTION⁴

Application	PRODURO TO-4+			
	10W	30	50	60
Powershift Transmissions ¹ , °C (°F)	-21 (-6) to +10 (+50)	-9 (+16) to +35 (+95)	+5 (+41) to +37 (+98.6)	Not recommended
Hydrostatic Transmissions ¹ , °C (°F)	-20 (-4) to +40 (+104)	+5 (+41) to +50 (+122)	N/A	N/A
Final Drives On-Highway ² , °C (°F)	-30 (-22) to 0 (+32)	-25 (-13) to +25 (+77)	-18 (0) to +50 (+122)	-11 (+12.2) to +55 (+131)
Final Drives Off-Highway ³ , °C (°F)	-30 (-22) to -10 (+14)	-25 (-13) to +15 (+59)	-18 (0) to +34 (+93)	-11 (+12.2) to +55 (+131)
Hydraulics, °C (°F)	-25(-13) to +50 (+122)	-15 (+5) to +50 (+122)	N/A	N/A
Output Transfer Gears	-32 (-26) to +30 (+86)	-20 (-4) to +50 (+122)	N/A	N/A
Powershift Transmissions (797)	Not recommended	-9 (16) to +50 (+122)	+3 (+37) to +55 (+131)	N/A
Hydraulic Systems (M Series Motor Graders)	-5 (+23) to +40 (+104)	+10 (+50) to +50 (+122)	N/A	N/A
Track Roller Fram Recoil Spring/Pivot Shaft Bearing	-32 (-26) to +0 (+32)	-22 (-8) to +25 (+77)	+3 (+37) to +50 (+122)	+3 (+37) to +52 (+126)
Drive Axles (Small /Med)	-27 (-17) to +15 (+59)	-22 (-8) to +43 (+109)	+3 (+41) to +50 (+122)	N/A
Drive Axles (Large)	-27 (-17) to +0 (+32)	-22 (-8) to +20 (+68)	-18 (0) to +43 (+109)	-7 (+19) to +52 (+126)
Starting Engine Transmissions	-32 (-26) to +20 (+68)	-12 (+10) to +25 (+77)	N/A	N/A
Variable pitch fans	Not recommended	-17 (+1) to +25 (+77)	-12 (+10) to +52 (+126)	Not recommended
Backhoe Loaders (Rear Axles)	Not recommended	-27 (-17) to +40 (+104)	+3 (+41) to +52 (+126)	+8 (+46) to +55 (+131)

Note: Ambient temperature range in °C (°F)

¹Powershift 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.

²Wheeled vehicles e.g. tractors, loaders, skidders, compactors and off-highway trucks

³Tracked vehicles e.g. tractors, pipelayers, skidders and loader

⁴Refer to "Caterpillar Machine Fluids Recommendations" service publication SEBU 6250 (most recent version) for more specific information.

TYPICAL PERFORMANCE DATA

Property	Test Method	PRODURO™ TO-4*			
		10W	30	50	60
Density @ 15°C, kg/l	D4052	0.857	0.871	0.887	0.894
Flash Point, °C (°F)	D92	236 (457)	276 (529)	279 (534)	274 (525)
Viscosity, cSt @ 40°C (SUS @ 100°F) cSt @ 100°C (SUS @ 210°F)	D445	36.6 (187.5)	85.4 (442.2)	199 (1048.4)	338.5 (1802)
		6.4 (47.6)	10.8 (63.1)	18.2 (93.3)	25.4 (125.7)
Viscosity Index	D2270	126	111	100	98
Brookfield Viscosity, cP @ °C (°F)	D2983	20,800 @ -35 (-31)	27,550 @ -26 (-15)	25,025 @ -15 (+5)	58,500 @ -10 (+14)
Cold Cranking Viscosity, cP @ °C (°F)	D5293	2,726 @ -25 (-13)	8,990 @ -20 (-4)	10,689 @ -10 (+14)	26,911 @ -10 (+14)
Borderline Pumping Viscosity cP @ °C (°F)	D4684	2,702 @ -25 (-13)	9,097 @ -20 (-4)	22,395 @ -15 (+5)	-
Pour Point, °C (°F)	D5950	-36 (-33)	-30 (-22)	-27 (-17)	-24 (-11)
Zinc, % wt	D4951	0.110	0.110	0.110	0.110
Calcium, % wt	D4951	0.350	0.350	0.350	0.350
Phosphorus, % wt	D4951	0.094	0.094	0.094	0.094
Sulfated Ash	D874	1.41	1.40	1.39	1.39
Foaming 1 2 3	D892	0/0	0/0	0/0	10/0
		5/0	10/0	30/0	0/0
		0/0	0/0	0/0	0/0
TBN	D2896	9.68	9.68	9.68	9.94

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

Learn more about us: lubricants.petro-canada.com
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Committed to the disciplined operation of our business.



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