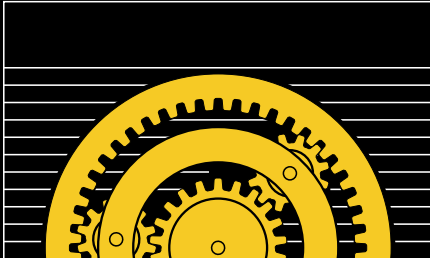


Synthetic Blend

# Transmission/Drive Train Oil

Transmission  
Multi Season

For Caterpillar® transmissions, wet brakes\*, and hydraulic compartments



Developed, tested, and approved by Caterpillar, Cat Transmission/Drive Train Oil (Transmission Multi Season) ensures optimum life and performance over a wide temperature range when used as recommended in Cat® transmissions, wet brakes, and hydraulic compartments.

## Recommended use

Cat Transmission/Drive Train Oil (TMS) is recommended as an option to replace Cat TDTO SAE 30 and 10W in Caterpillar transmissions, wet brakes, and hydraulic compartments where a multiviscosity product would offer improved performance over a wider temperature range. This oil should not be used in engines because it can shorten engine life.

## Typical Characteristics\*\*

Manufacturer's Test	
CAT	TO-4M, TO-4
Allison	C-4
Gravity, API <sup>®</sup> (ASTM D287)	29.1
Appearance (Visual)	clear and bright
Flash Point, °C (°F) (ASTM D92)	230 (446)
Pour Point, °C (°F) (ASTM D97)	-39 (-38)
Viscosity,	
cP @ -20°C (ASTM D2602)	9,400
cSt @ 40°C (ASTM D445)	105
cSt @ 100°C (ASTM D445)	14.1
Viscosity Index (ASTM D2270)	135
KRL Shear Stability	10.0%
Calcium, % wt. (ASTM D874)	0.298
Sulfated Ash, % wt. (ASTM D874)	1.2
Zinc, % wt. (ASTM D1091)	0.127
Phosphorous, % wt. (ASTM D1091)	0.110
TBN (ASTM D2896)	8.4

\* Do not use in off-highway truck brake systems.

\*\* The values shown are typical values and should not be used as quality control parameters to either accept or reject product. Specifications are subject to change without notice.



Synthetic Blend

# Transmission/Drive Train Oil

## Recommended use (continued)

Year-round machine operations can require the change of transmission oil before the recommended oil change interval is reached. Cat TDTO (TMS) can be used year round in many applications:

### POWERSHIFT TRANSMISSIONS \*

Season	Oil Type	Recommended Ambient Temperature Range			
		°Celsius		°Fahrenheit	
		min.	max.	min.	max.
Summer	TDTO SAE 30	0	+35	+32	+95
Winter	TDTO SAE 10W	-20	+10	-4	+50
<b>Multi-Season</b>	<b>TDTO (TMS)</b>	<b>-10</b>	<b>+35</b>	<b>+14</b>	<b>+95</b>

TO-4M can be used in multiple compartments, such as transmission, wet brakes, and hydraulics, reducing the number of oils required to support the machine. Cat TDTO (TMS) can reduce the number of Cat oils required from four to two.

Compartment	Cat Fluids (without TMS)	Cat Fluids (with TMS)
Engine	DEO 15W40	<b>DEO 15W40</b>
Transmission	TDTO SAE 30	<b>TDTO (TMS)</b>
Hydraulics	HYDO SAE 10W	<b>TDTO (TMS)</b>
Wet Brakes	TDTO SAE 10W	<b>TDTO (TMS)</b>
Total Oils Required	4	<b>2</b>

We can help you determine the right oil for your Cat machines or you can refer to your “Operation and Maintenance Manual” or Service Publication SEBU 6250 (“Caterpillar Machine Lubricant Recommendations”). Cat fluid recommendations are now available on the Internet at:

[www.CAT.com/products/partserv/fluids/fluprod/index.htm](http://www.CAT.com/products/partserv/fluids/fluprod/index.htm)

\* For use in other compartments, see Cat Machine Fluids Recommendations (SEBU6250).

## Advanced formula for maximum performance and protection

Cat Transmission/Drive Train Oil (TMS) is a **synthetic blend** (partial synthetic) **multiviscosity** oil formulated for use in Cat powershift transmissions, wet brakes, and hydraulic systems. It provides a balance of static and dynamic friction characteristics with metallic and nonmetallic materials, ensuring increased load-carrying capacity and component durability.

The unique, shear-stable formulation of Cat TDTO (TMS) provides long-lasting protection in conditions where multigrade fluids made from mineral oils and conventional viscosity index improvers fall short. Shear stability can be a problem when more common Viscosity Index Improvers, like those used in most multigrade mineral oils, are used to widen the operating temperature range. These mineral oil VI improvers shear down in operation, resulting in an oil that provides less protection than expected. Cat TDTO (TMS) uses a blend of high-quality mineral oil and synthetic base stocks, along with a shear-stable Viscosity Index Improver, to provide sufficient high-temperature film thickness.

TDTO (TMS) utilizes base stock and additive technology developed for Caterpillar that provides an optimum balance between clutch friction disc and gear wear requirements over a wider temperature range than what is possible with monograde Cat TO-4 oils.

## New standards for maximum performance (TO-4M)

Cat TDTO (TMS) exceeds the new Cat TO-4M standard covering the use of multigrade oils in Cat transmissions, hydraulics, and wet brakes. Cat TO-4 only covers monograde oils for use in Caterpillar transmissions, final drives, and wet brakes. TO-4M is a new standard developed by Caterpillar that defines the performance requirements that a powertrain oil must meet to be sold as an acceptable multiviscosity oil for Cat transmissions, wet brakes, and hydraulic compartments.

## Fluid analysis for early detection

We recommend protecting your investment by using scheduled fluid analysis. Our S-O-S<sup>SM</sup> analysis program is the ultimate detection and diagnostic tool for your equipment, helping you head off potential problems before they can lead to major failures and costly unscheduled downtime.

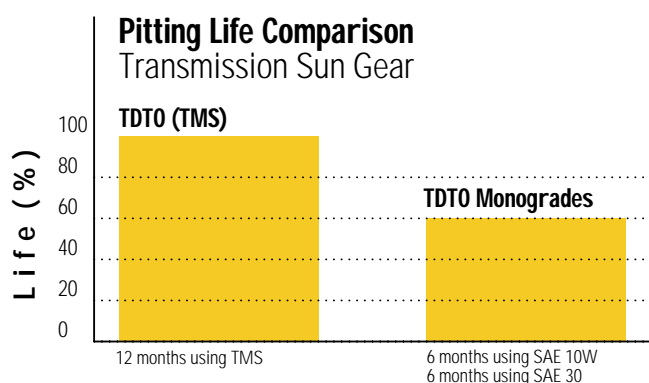
## Customer benefits

TDTO (TMS) provides all the same benefits of Cat TDTO SAE 10W and SAE 30 by:

- eliminating transmission and brake slippage caused by commercial engine oils that claim TO-2 performance.
- increasing clutch disc life up to 45%.
- controlling brake chatter.
- increasing machine breakout force.
- providing greater machine rim pull.
- providing compatibility with seals and elastomers, including fluoroelastomers, used in Cat drivetrain and hydraulic systems.

Plus, Cat TDTO (TMS) provides:

- operation over a broad temperature range, eliminating premature oil changes due to seasonal temperature variations.
- improved transmission performance and efficiency in cold weather, especially for machines with electronic controls.
- extended oil drain capability.
- multiple compartment use in transmissions, wet brakes, and hydraulics, minimizing the number of oils required to support the machine.
- improved transmission gear life versus using TDTO SAE 10W in winter and SAE 30 in summer.



## Proper use for health and safety

According to toxicology information, Cat Transmission/Drive Train Oil (TMS) has little or no adverse effects if handled and used properly. No special precautions are suggested beyond attending to good personal hygiene and avoiding prolonged, repeated skin contact. For more information, refer to the "Material Safety Data Sheet," SEFV1602, or the Cat Internet site:

[www.CAT.com/products/custserv/MSDS](http://www.CAT.com/products/custserv/MSDS)

## Comparative Tests

Cat TO-4 and TO-4M define a minimum level of performance for the industry that is acceptable for use in Cat machines. Cat TDTO and Cat TDTO (TMS) are required to exceed this minimum standard by passing additional proprietary Cat tests.

	Cat TDTO (TMS)	TO-4M	Cat TDTO	TO-4
<b>Chemical and Physical Properties</b>	Pass	Fail	Pass	Fail
Fluoroelastomer/Elastomer compatibility	Pass	Fail	Pass	Fail
Oxidation stability	Pass	Fail	Pass	Fail
Rust control	Pass	Fail	Pass	Fail
Copper corrosion	Pass	Fail	Pass	Fail
Homogeneity	Pass	Fail	Pass	Fail
Foaming	Pass	Fail	Pass	Fail
Compatibility	Pass	Fail	Pass	Fail
<b>Wear Test</b>	Pass	Fail	Pass	Fail
FZG Gear Wear	Pass	Fail	Pass	Fail
35VQ25 Vane Pump Test	Pass	Fail	Pass	Fail
<b>Friction Performance</b>	Pass	Fail	Pass	Fail
Wear, pressure, speed, energy limit	Pass	Fail	Pass	Fail
Bronze	Pass	Fail	Pass	Fail
Paper (Brake)	Pass	Fail	Pass	Fail
Paper (Transmission)	Pass	Fail	Pass	Fail
Paper (Steering Brake)	Pass	Fail	Pass	Fail
Elastomeric (Transmission)	Pass	Fail	Pass	Fail
F-37	Pass	Fail	Pass	Fail
Rayflex	Pass	Fail	Pass	Fail
<b>Viscosity</b>	Pass	Fail	Pass	Fail
SAE J300	Pass	Fail	Pass	Fail
Low-Temperature Brookfield	Pass	Fail	Pass	Fail
30,000 cP Low-Temperature Pumpability	Pass	Fail	Pass	Fail
10,000 cP Low-Temperature Pumpability	Pass	Fail	Pass	Fail
High-Temperature Film Thickness	Pass	Fail	Pass	Fail
KRL Shear Stability	Pass	Fail	Pass	Fail
<b>Cat Full-Scale Vehicle Test</b>	Pass	Fail	Pass	Fail
<b>Cat Full-Scale Final Drive Wear Test</b>	Pass	Fail	Pass	Fail
<b>Cat Full-Scale Transmission Endurance Test</b>	Pass	Fail	Pass	Fail
<b>Cat 980F Brake Noise and Stopping Distance Test</b>	Pass	Fail	Pass	Fail
<b>Cat Full-Scale Timken Tapered Roller Bearing Fatigue Test</b>	Pass	Fail	Pass	Fail

# Extend equipment life with quality Cat maintenance products.

**Cat Fluids:** Formulated to provide higher standards in performance and life.

**Cat Fluid Filters:** System engineered for optimal performance and protection.

**S-O-S Fluid Analysis:** The ultimate detection and diagnostic tool for your equipment.

**Maintenance Software:** Trend Analysis Module (TAM) for S-O-S results, Maintenance Control System (MCS) for scheduling and record keeping, and Preventive Maintenance Planner (PMP) for comprehensive maintenance checklists.



**CATERPILLAR®**