MOTTA LUBRICATION | TECHNICAL GUIDANCE

TO-4 SERIES
Powershift Transmission Fluid — SAE 10 / 30 / 50

OPERATION AND HANDLING INSTRUCTIONS

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MOTTA-TO4-OHI-EN	REV.01	2026-09-13	Issued for use

Use with the current product TDS, SDS and the equipment manufacturer's operation and maintenance manual. Issued by MOTTA Lubricants. The current revision of this document is published at motta-lube.com/documents/ — if your copy differs, that list governs.

1 Scope

This document applies to the selection, draining, filling, in-service monitoring and fluid change of MOTTA TO-4 Series powershift transmission fluid, SAE 10, SAE 30 and SAE 50, in off-highway equipment. For use only by trained maintenance personnel.

- Powershift transmissions and torque converters, where the equipment manufacturer requires a TO-4 type fluid.
- Final drives and differentials, where the manufacturer requires a TO-4 type fluid.
- Wet brakes, where the brake compartment specifies a TO-4 type fluid.
- Hydraulic compartments, only where the manufacturer lists a TO-4 type fluid for that system.

Not covered: engine crankcases; passenger-car automatic, CVT and dual-clutch transmissions (see MOTTA-ATF-OHI); hydraulic systems for which the manufacturer specifies a hydraulic oil; and compartments that call for a multigrade TO-4M or a manufacturer-specific fluid, unless suitability is confirmed.

The equipment manufacturer's operation and maintenance manual, the product TDS and SDS, and site rules take precedence. Where requirements conflict, apply the stricter safety condition.

MOTTA products covered by this handbook

Product	Grades	Standards and performance levels	Pack sizes
MOTTA TO-4 Series	SAE 10, SAE 30, SAE 50	Caterpillar TO-4	18L / 200L

Grades, standards and pack sizes as published on each product's technical data sheet at motta-lube.com/products/. Where a data sheet and this table differ, the data sheet governs.

Caterpillar TO-4 is the performance direction this fluid is formulated toward, as stated on its data sheet. No equipment-manufacturer approval is claimed unless separately documented.

2 Selection by compartment

Important: a TO-4 fluid is formulated to hold friction in wet clutches and wet brakes. Engine oil, ATF or a general hydraulic oil in the same compartment can cause brake chatter, clutch slip and loss of braking performance, even when the viscosity grade looks right.

Compartment	What sets the grade	Common error
Powershift transmission, torque converter	The manufacturer's chart for that compartment and the ambient temperature range	Using engine oil or ATF because it is to hand
Final drive, differential	The manufacturer's chart — frequently a different grade from the transmission	Using the transmission grade in every compartment
Wet brakes	The fluid type the brake compartment specifies	Topping up from the nearest drum of hydraulic oil
Hydraulic compartment	Only where the manufacturer lists a TO-4 type fluid	Assuming every hydraulic tank on the machine takes TO-4

- Select the SAE grade for each compartment from the manufacturer's viscosity chart for the ambient temperature range the machine works in. Compartments on one machine often need different grades.
- For cold starts, compare the typical pour point on the product data sheet with the lowest start temperature. Where the manufacturer allows a lighter grade for cold operation, follow that chart.
- Caterpillar TO-4 is the performance direction this product is formulated toward, as stated on the data sheet. Confirm that it meets the requirement written in the equipment manual.
- Verify the product name, SAE grade, batch number and intact seal. Label transfer containers by grade.

3 Isolation, draining and filling

- Park on level ground, lower implements and buckets to the ground, apply the parking brake, stop the engine and block the wheels or tracks. Follow the site lock-out procedure.
- Oil at working temperature can cause burns and a compartment may be under pressure. Release pressure by the manufacturer's procedure before opening any plug or cap.
- Drain while the oil is warm so contaminants stay suspended, and collect the oil for disposal.
- Inspect magnetic plugs and screens as the oil drains and record what is found. Metal on a plug is evidence, not dirt to wipe off.
- Replace filters as specified. Fill with clean equipment to the specified level, checked by the specified method — many powershift transmissions are checked with the engine running and the oil at operating temperature.
- Do not overfill: excess oil can foam, drag clutches and overheat.

4 Start-up and function checks

- Run the engine and cycle the transmission through its ranges as the manufacturer specifies, then re-check the level at operating temperature.
- Inspect drain plugs, filters and hoses for leaks before the machine returns to work.

Safety: after any work on wet brakes, final drives or the transmission, test the service brakes and the parking brake at low speed in a clear area before the machine returns to work.

5 In-service monitoring

Item	Minimum requirement	Key judgement
Level and temperature	Each shift, by the specified method	A falling level means a leak or oil moving between compartments
Running hours	Recorded for every compartment	Service and sampling intervals are set in hours, not calendar time
Oil sampling	At the manufacturer's interval, same point and method each time	Judge the trend against the new-oil reference for the grade in use
Magnetic plugs and filters	At each service	New or increasing metal is investigated before the next shift
Brakes and shifting	Operator reports each shift	Chatter, noise, slip or harsh shifting are warnings, not habits

6 Contamination control

- Water: wash-down, water crossings, damaged seals and condensation let water in. Milky oil or free water needs action, not observation.
- Dust: keep breathers, filler caps and filler areas clean, and clean around a cap before opening it.
- Cross-contamination: engine oil, hydraulic oil or coolant in a TO-4 compartment changes friction behaviour or attacks components. Coolant in oil points at a cooler failure and must be traced.
- Use a dedicated, labelled container and pump for each fluid type and grade.

7 Fluid-change interval and judgement

The fluid-change interval follows the equipment manufacturer's maintenance manual and is set in running hours. Heavy load, high ambient temperature, dusty sites and water exposure normally require a shortened interval; oil analysis is the basis for any change to it.

Observation	Continue in service	Requires attention	Change fluid / inspect now
Brakes and shifting	Normal	Occasional slight chatter or a harsh shift	Clear chatter, slip or loss of braking
Oil condition	Normal appearance	Darker, no burnt odour	Milky, burnt odour or visible metal
Running hours	Within the interval	Approaching the limit	Beyond the manufacturer's interval

Note: the above is an initial field-screening reference only. It does not replace the manufacturer's interval and is not a product guarantee. A burnt odour or visible metal points at component damage; inspect the transmission, brake or final drive rather than only changing the fluid.

8 Top-up, mixing and conversion

- Top up with the same product and SAE grade already in the compartment, and record the reason and quantity.
- Do not mix SAE grades or fluid types in one compartment unless the manufacturer allows it.
- When converting from another fluid, drain and flush by the manufacturer's procedure, and watch brakes and shifting closely during the first hours of operation.
- Where component wear or a mechanical fault is suspected, find the cause first. A fluid change does not repair a worn clutch or brake.

9 Abnormal-condition handling

Situation	Primary action
Brake chatter or noise	Stop in a safe place and verify the fluid type in the brake compartment
Loss of braking performance	Remove the machine from service immediately; do not operate until inspected
Clutch slip or delayed engagement	Reduce load, check level and fluid type, and refer to a qualified technician
Milky oil or free water	Find the water entry point, drain and replace the fluid, and check brakes and bearings
Metal on a magnetic plug	Record it, retain a sample, and inspect the component before return to service
Overheating	Check level, cooler and load; stop if the temperature keeps rising
Spill	Contain and clean up in line with the SDS and site rules

10 Reference values — indicative, not a MOTTA specification

The figures below are published industry references, given so that a reading can be judged on site when the machine documentation is not to hand. They are screening prompts, not scrap limits. Where the equipment manufacturer, the component manufacturer or your oil analysis laboratory states a figure, that figure governs and this table does not apply.

Specification reference

Reference	What it covers	Published by
Caterpillar TO-4	Fluid requirements for powershift transmissions, final drives and wet brakes	Caterpillar
SAE J300	Viscosity grades — SAE 10, 30 and 50 in this series	SAE

When a reading is worth investigating

What is measured	Prompt to investigate	Why this figure
Kinematic viscosity at 40 °C	More than ±10 % from the new-oil reference for that product	Common condition-monitoring screening value; also confirms the correct product is in the system
Water	Milky oil, or any free water	Wash-down, water crossings and seals let water in; water attacks friction material and bearings
Wear metals in oil analysis	A change in the copper or iron trend for that compartment	Copper usually comes from clutch plates and bushings; the trend on one unit and one compartment is the signal
Magnetic plugs and filters	New or increasing metal at a service	Debris on a plug shows wear before an oil sample does
Brakes	Chatter or noise from wet brakes	The usual first sign that the brake compartment holds the wrong fluid type
Sustained oil temperature	Above the manufacturer's normal operating range	Oxidation rate roughly doubles for every 10 °C — the standard rule of thumb

Analysis limits for your machines are set by the equipment manufacturer's fluid analysis programme or your laboratory. Judge each compartment against its own history.

A single result is a reason to look, not a reason to drain. Establish the new-oil reference for the product actually in use, trend against it, and find the cause before changing the oil — changing the oil does not remove a contamination source or a mechanical fault.

11 Storage and waste handling

- Keep original containers sealed in a cool, dry, ventilated place away from ignition sources.
- Store drums under cover, or on their side with the bungs at the three and nine o'clock positions, so rainwater cannot be drawn in as the drum cools.
- Keep grades separate and clearly labelled to prevent a wrong top-up.
- Collect used oil, filters and oily materials separately and hand them to a compliant disposal contractor under local regulations.

Use and document information

Caution: this document provides general operating guidance and does not constitute engineering design, legal advice or a guarantee of outcome for any specific machine, country or site condition.

- Conditions of use: confirm the product, compartment, warranty terms and regulatory requirements before use. Any unconfirmed substitution should first be discussed with the equipment manufacturer or a qualified technician.
- Data and limits: grades, intervals and other figures follow the equipment manufacturer's manual, the product TDS and the SDS. This document does not set universal guarantee values.
- Limitation of liability: to the extent permitted by applicable law, MOTTA does not warrant against losses caused by incorrect selection, unconfirmed mixing, equipment defects or failure to follow the manufacturer's requirements. This clause does not exclude liability that cannot be excluded or limited by law.

Revision 01: first issue as a standalone handbook for MOTTA TO-4 fluids, separated from the transmission-fluid handbook MOTTA-ATF-OHI so that off-highway selection, wet brakes, final drives and running-hours maintenance are covered in full.

Recommended Records to Retain

Record	Details to retain
Unit	Model, unit number, running hours.
Compartment and fluid	Compartment, product, SAE grade, batch number, quantity.
Service	Date, running hours, filters, magnetic plug findings, person responsible.
Oil sample	Sample ID, date, hours, laboratory results, action taken.
Brakes	Brake test after service, operator reports of chatter or noise.