
Heavy Duty Diesel Engine Oil and Filter Change Procedure

1.0 Maintenance Objective & Frequency

The objective of this procedure is to replace the engine oil and oil filter on a heavy duty diesel engine to remove contaminants, replenish additives, and ensure proper lubrication of all internal components. This PM prevents accelerated wear of bearings, cylinder liners, piston rings, and turbocharger, and maintains optimal engine performance and fuel efficiency.

Frequency: Every 250 operating hours or as specified by the engine manufacturer (typically 250-500 hours for severe duty). For engines using oil analysis, follow the recommended interval based on oil condition. Always consult the OEM manual for the specific engine model.

2.0 Lockout/Tagout (LOTO) & Safety

- **Engine Shutdown:** Ensure the engine is shut down and has cooled for at least 30 minutes to prevent burns from hot oil and components.
- **Electrical Isolation:** Disconnect the battery negative terminal (or master disconnect switch) to prevent accidental starting during maintenance.
- **Pneumatic/Hydraulic Isolation:** If equipped with an air starter or hydraulic fan drive, isolate and bleed the system per OEM procedure.
- **Hot Surface Hazard:** Use caution around exhaust manifolds, turbochargers, and other hot surfaces. Wear heat-resistant gloves.
- **Mandatory PPE:** Safety glasses, oil-resistant gloves (nitrile or neoprene), steel-toed boots, and coveralls. Use a face shield when draining hot oil.
- **Spill Containment:** Position a drip pan and absorbent pads under the drain plug and filter area to capture any oil spills.

3.0 Required Tools, Parts & Lubricants

- Engine oil (correct viscosity and API/CJ-4 or CK-4 specification per OEM – e.g., 15W-40, quantity as per engine sump capacity)
- Oil filter (OEM or equivalent high-quality spin-on or cartridge type)
- Oil filter wrench (appropriate size for the filter)
- Socket set and ratchet (for drain plug – typically 19mm, 24mm, or 27mm)
- Torque wrench (capable of 30-150 Nm range)
- Oil drain pan (minimum 20 litre capacity)
- Funnel (clean, dedicated for oil)
- Shop towels or lint-free rags
- Oil filter pre-fill container (if recommended by OEM)
- Pry bar or filter removal tool (if filter is stuck)
- Caliper or tape measure (to measure oil level dipstick)

- Oil analysis sample kit (optional, for condition monitoring)

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO: Shut down engine, allow to cool for 30 minutes, disconnect battery negative terminal, and place a 'Do Not Operate' tag on the start switch.
2. Position the oil drain pan under the engine oil drain plug. Ensure the pan is large enough to hold the full oil capacity.
3. Remove the oil fill cap to allow the oil to drain faster and prevent vacuum lock.
4. Using the correct socket, loosen and remove the oil drain plug. Allow the oil to drain completely into the pan. Inspect the drain plug for metal particles or debris.
5. While the oil is draining, locate the oil filter. Place a rag or absorbent pad under the filter to catch residual oil.
6. Using the oil filter wrench, loosen and remove the old oil filter. Be careful of hot oil. Dispose of the old filter in an approved container.
7. Clean the filter mounting surface on the engine block with a lint-free rag. Ensure no old gasket material remains.
8. Apply a thin film of clean engine oil to the gasket of the new oil filter. If the filter is a spin-on type, fill it with clean oil (if OEM allows) to reduce dry start time. For cartridge filters, install the new element and O-rings per manufacturer instructions.
9. Install the new oil filter by hand until the gasket contacts the mounting surface, then tighten an additional 3/4 to 1 turn (or to OEM torque specification, typically 20-30 Nm). Do not overtighten.
10. Clean the drain plug threads and install a new crush washer if applicable. Reinstall the drain plug and torque to OEM specification (e.g., 45-70 Nm for typical heavy duty engines).
11. Using a clean funnel, add the specified quantity of new engine oil through the fill port. Do not overfill. Replace the oil fill cap.
12. Reconnect the battery negative terminal. Start the engine and let it idle for 2-3 minutes. Check for oil leaks at the filter and drain plug. Shut off the engine and wait 5 minutes for the oil to settle.
13. Check the oil level using the dipstick. Top off as necessary to reach the 'Full' mark. Do not overfill.

5.0 Verification & Return to Service

1. Verify no oil leaks at the filter, drain plug, or any other service points after the engine has run and been shut down.
2. Check the engine oil pressure gauge (if equipped) during the test run. It should read within normal operating range (typically 30-60 psi at idle, higher at speed).
3. Confirm the oil level is correct on the dipstick (between 'Add' and 'Full' marks, preferably at 'Full').
4. Dispose of used oil and filter in accordance with local environmental regulations. Used oil must be collected in a designated waste oil container.
5. Record the engine hours, date, oil type and quantity, filter part number, and any observations (e.g., metal particles in old oil) in the maintenance log or ServiceGrid work order.
6. Remove LOTO tags and return the engine to service. Notify the operator that the PM is complete.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.