

Diesel Exhaust Fluid (DEF) Dosing System: Filter Replacement & Dosing Unit Maintenance

1.0 Maintenance Objective & Frequency

The objective of this procedure is to replace the Diesel Exhaust Fluid (DEF) supply filter and perform a visual inspection of the dosing module to prevent clogging, crystallization, and injector failure. A clean DEF filter ensures proper flow to the dosing unit, maintaining precise NOx reduction and preventing costly SCR system repairs.

This PM is required every 2,000 operating hours or annually, whichever comes first. In high-sulfur fuel environments or extreme dust conditions, reduce interval to 1,000 hours.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect the main battery disconnect switch or remove the negative battery cable. Verify zero voltage with a multimeter at the dosing module power connector.
- **Pneumatic Isolation:** If the system uses compressed air for purge, close the air supply valve and bleed residual pressure from the line.
- **DEF Fluid Hazard:** DEF is non-toxic but can irritate eyes and skin. Wear splash-proof safety glasses and nitrile gloves. Avoid contact with painted surfaces—DEF is corrosive to paint.
- **Hot Surface Warning:** Allow the exhaust system and dosing module to cool below 50°C before beginning work to prevent burns.

3.0 Required Tools, Parts & Lubricants

- OEM-approved DEF supply filter (part number per engine/vehicle manual)
- Clean, fresh DEF fluid (ISO 22241 compliant)
- 10mm combination wrench
- Flathead screwdriver (small, for hose clamp removal)
- Torque wrench (0-30 Nm range)
- Digital multimeter (for voltage verification)
- Clean lint-free rags
- Splash-proof safety glasses and nitrile gloves
- DEF-compatible container (to catch residual fluid)

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO: disconnect battery power and verify zero voltage at the dosing module connector using a multimeter. If pneumatic purge is present, close air supply and bleed line.
2. Locate the DEF supply filter assembly. Typically mounted on the DEF tank or along the supply line near the dosing module. Refer to equipment-specific manual if needed.

3. Place a clean rag and a small container under the filter to catch any residual DEF fluid. Slowly loosen the filter housing using a 10mm wrench (if threaded) or release the quick-connect fittings per OEM instructions.
4. Remove the old filter element. Inspect the housing for any signs of crystallization, debris, or corrosion. Clean the housing interior with a lint-free rag. Do not use compressed air—moisture contamination can damage the SCR system.
5. Lubricate the O-ring on the new filter with a small amount of clean DEF fluid. Install the new filter element into the housing, ensuring it seats fully. Hand-tighten the housing until snug, then torque to 12 Nm (or per OEM spec). Do not overtighten.
6. Inspect the DEF dosing module (injector) for any visible crystallization, cracks, or leaks. If crystallization is present, carefully clean the nozzle tip with a soft brass brush and DEF fluid. Do not use wire brushes or abrasive tools.
7. Check the DEF supply hose from tank to dosing module for kinks, abrasions, or loose connections. Replace any damaged sections. Ensure all hose clamps are tight.
8. Reconnect all electrical connectors to the dosing module. Ensure the locking tab clicks into place. Reconnect battery power and remove LOTO devices.
9. Prime the DEF system: Turn the ignition to the 'On' position (do not start engine). The DEF pump will run for 30-60 seconds to purge air from the filter and lines. Listen for the pump cycling—if it runs longer than 90 seconds, check for leaks or air ingress.
10. Start the engine and allow it to idle for 2 minutes. Observe the dosing module for any drips or leaks. Verify that the DEF gauge (if equipped) shows normal fluid level.

5.0 Verification & Return to Service

1. Perform a road test or load cycle for 10 minutes to ensure the SCR system reaches operating temperature and begins dosing. Monitor the DEF consumption rate via the engine ECU (if accessible).
2. Check for any diagnostic trouble codes (DTCs) related to DEF system pressure, flow, or dosing. Clear any codes that were present before maintenance only after verifying the issue is resolved.
3. Inspect the filter housing and all connections for leaks after the test cycle. Tighten if necessary.
4. Record the maintenance in ServiceGrid: log hours/mileage, filter part number, and any observations (e.g., crystallization found, hose condition). Sign off on the PM work order.

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.