
Hydraulic Press Preventive Maintenance Fluid Sampling Protocol

1.0 Maintenance Objective & Frequency

The objective of this procedure is to obtain a representative, uncontaminated sample of hydraulic fluid from the press reservoir for laboratory analysis. This proactive step detects particulate contamination, water ingress, viscosity degradation, and abnormal wear metal concentrations before they cause pump failure, valve sticking, or cylinder scoring.

Frequency: Every 500 operating hours or quarterly, whichever comes first. Additionally, sample immediately after any major component replacement (pump, valve bank, cylinder) or if the fluid appears cloudy, dark, or smells burnt.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect and lock out the main disconnect switch for the hydraulic power unit. Verify zero voltage with a rated voltmeter.
- **Hydraulic Isolation:** Close the ball valve on the pump suction line (if equipped) to prevent accidental fluid flow during sampling.
- **Mechanical Isolation:** Ensure the press ram is fully lowered and resting on mechanical stops or blocks. Chock any movable platens.
- **PPE:** Wear safety glasses, nitrile gloves (fluid resistant), and oil-resistant steel-toed boots. Have a spill kit within arm's reach.

3.0 Required Tools, Parts & Lubricants

- Clean, dry sample bottle (250-500 mL, supplied by the lab or certified particle-free).
- Vacuum sampling pump with clean tubing (dedicated to this fluid type).
- Lint-free wipes (Kimwipes or equivalent).
- Permanent marker and pre-printed label with barcode (if using lab tracking).
- Spill kit (absorbent pads, granular absorbent, disposal bags).
- Flashlight (to inspect reservoir interior).
- Sample submission form (paper or digital).

4.0 Step-by-Step Maintenance Procedure

1. Perform full LOTO as described in Section 2.0. Confirm zero energy state.
2. Locate the reservoir sampling port. Ideally, use a dedicated sampling valve installed on the return line or a dipstick tube. If none exists, use the fill port or drain plug (preferred: drain plug after flushing).
3. Clean the sampling port exterior with a lint-free wipe to remove dirt and debris. Do not allow any cleaning solvent to enter the system.
4. If using a sampling valve: Attach the vacuum pump tubing to the valve. Open the valve and allow 100-200 mL of fluid to flow into a waste container to flush the dead leg. Close the valve.

5. Attach a clean sample bottle to the tubing. Open the valve and fill the bottle to 75-80% capacity (do not overfill). Close the valve, remove the bottle, and cap immediately.
6. If using a drain plug: Remove the plug and allow the first 200 mL to drain into a waste container. Then, place the sample bottle under the stream and fill to 75-80%. Replace and torque the drain plug to OEM specification (typically 25-35 Nm for NPT fittings).
7. Label the bottle immediately with: Machine ID, date, time, fluid type, hours on fluid, and sampler initials. Place the label on the bottle body, not the cap.
8. Complete the lab submission form with the same data plus any recent maintenance notes (e.g., filter change, top-off volume).
9. Package the sample bottle in a sealed plastic bag and place in the shipping box with absorbent material. Store at ambient temperature until pickup.
10. Wipe up any drips with absorbent pads. Dispose of used wipes and waste fluid in accordance with local hazardous waste regulations.

5.0 Verification & Return to Service

1. Verify the reservoir fluid level is within the sight glass operating range. Add the same grade of hydraulic fluid if necessary (record top-off volume on the work order).
2. Remove all LOTO devices. Restore electrical power. Open the suction line ball valve.
3. Start the hydraulic pump and let it circulate for 2-3 minutes. Listen for cavitation or unusual noise. Check for leaks at the sampling port.
4. Cycle the press through one full stroke (open, close, apply pressure) at low speed. Verify smooth operation and no abnormal sounds.
5. Sign off on the PM work order in ServiceGrid. Attach the sample tracking number and submission date. Flag the work order for follow-up when the lab report is received.

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.