

Total Productive Maintenance (TPM) Operator Autonomous Care Checklist

1.0 Maintenance Objective & Frequency

The objective of this Total Productive Maintenance (TPM) Operator Autonomous Care Checklist is to empower machine operators to perform daily cleaning, inspection, lubrication, and minor adjustments on their assigned equipment. This procedure aims to prevent accelerated wear, identify early signs of failure (e.g., leaks, abnormal noise, vibration), and maintain baseline machine condition without requiring skilled trades intervention. Consistent execution of this checklist supports the TPM pillars of Autonomous Maintenance and Focused Improvement, reducing unplanned downtime and improving Overall Equipment Effectiveness (OEE).

Frequency: Daily, at the start of each shift (or as defined by the production schedule). Estimated time: 15-20 minutes per machine.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Place the main disconnect switch in the OFF position and apply a personal lock and tag. Verify zero energy state with a voltmeter if accessing electrical panels.
- **Pneumatic Isolation:** Close the manual shut-off valve at the point of use and bleed residual air from the system by actuating a downstream valve or opening a drain cock.
- **Hydraulic Isolation:** Close the hydraulic isolation valve and cycle the machine controls to relieve trapped pressure. Wait 60 seconds before proceeding.
- **Mechanical Lockout:** For machines with stored energy (e.g., springs, counterweights), physically block or secure moving parts before cleaning or inspecting.
- **Mandatory PPE:** Safety glasses with side shields, steel-toed boots, cut-resistant gloves (ANSI A4 or higher), and hearing protection (if noise >85 dBA). For cleaning tasks, add chemical-resistant gloves and a face shield if using solvents.

3.0 Required Tools, Parts & Lubricants

- Clean lint-free rags (white, non-abrasive)
- Soft-bristle brush (2-inch width) and a stiff-bristle brush for stubborn debris
- Approved industrial degreaser (e.g., CRC 05005 or equivalent, non-flammable)
- ISO VG 68 hydraulic oil (for lubrication points as specified by OEM)
- NLGI #2 lithium-based grease gun with a flexible hose
- Digital thermometer (infrared, range -20°C to 500°C)
- Stroboscope or vibration pen (for basic bearing check)
- Torque wrench (adjustable, 10-100 Nm range) with appropriate sockets
- Operator care log sheet or digital checklist (e.g., ServiceGrid mobile app)
- Personal lock and tag set (LOTO kit)

4.0 Step-by-Step Maintenance Procedure

1. Perform Lockout/Tagout (LOTO) as per Section 2.0. Confirm zero energy state by attempting a normal start cycle (machine should not move).
2. Visually inspect the machine exterior for any obvious damage, loose panels, or missing guards. Report any anomalies immediately to the shift supervisor.
3. Using the soft-bristle brush and a clean rag, remove all loose debris, dust, and chips from the machine surfaces, paying special attention to cooling fins, vents, and electrical enclosures. Do not use compressed air to blow debris as it can force contaminants into bearings and seals.
4. Apply approved degreaser to a clean rag (not directly to the machine) and wipe down all exposed guide rails, ball screws, and linear bearings. Remove any built-up grease or oil residue. Inspect for scoring, pitting, or discoloration.
5. Check all fluid levels: hydraulic oil reservoir, coolant tank, and lubrication oil sump. Top up to the manufacturer's recommended level using the specified lubricant. Record the amount added on the log sheet.
6. Lubricate all grease fittings (zerk fittings) with NLGI #2 grease. Apply 2-3 pumps per fitting unless otherwise specified by the OEM. Wipe away any excess grease to prevent attracting debris.
7. Inspect all belts and chains for proper tension (deflection of 1/2 inch per foot of span is typical) and signs of wear (cracking, glazing, elongation). Adjust tension using the idler pulley or take-up mechanism, then torque retaining bolts to 25 Nm.
8. Check all pneumatic hoses and fittings for leaks using a soap-and-water solution or an ultrasonic leak detector. Tighten any loose fittings to 15 Nm. Replace any cracked or brittle hoses immediately.
9. Using the infrared thermometer, measure the temperature of the main drive motor housing, gearbox, and bearing housings. Compare to baseline values (typically <70°C for bearings, <90°C for motors). Record any readings above baseline.
10. Use the stroboscope or vibration pen to check for abnormal vibration on the main spindle or drive shaft. A smooth, consistent reading indicates healthy bearings. Note any erratic or high-amplitude readings.
11. Inspect all electrical connections (terminal blocks, contactors, relays) for signs of overheating (discoloration, melting) or loose wires. Tighten any loose connections to the manufacturer's torque specification (typically 2-4 Nm for control wiring). Do not touch live circuits.
12. Clean or replace any air filters on the machine control cabinet and cooling fans. Use compressed air (blowing from the clean side outward) or replace with OEM-approved filters. Ensure the cabinet door seals are intact.

5.0 Verification & Return to Service

1. Remove all personal locks and tags. Restore power by closing the main disconnect switch and opening the pneumatic/hydraulic isolation valves.
2. Perform a dry cycle (no material) through all machine axes and functions. Listen for abnormal noises (grinding, squealing, knocking) and watch for erratic movements. Verify that all safety interlocks function correctly.
3. Run a test part using standard production parameters. Measure critical dimensions with a caliper or go/no-go gauge to ensure the machine is producing within tolerance. If out of tolerance, notify the maintenance team.
4. Complete the operator care log sheet or digital checklist in ServiceGrid, noting any observations, fluid added, or adjustments made. Flag any items that require follow-up by a skilled tradesperson.
5. Sign off on the PM work order in ServiceGrid, confirming that the autonomous care checklist has been completed and the machine is ready for production.

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.