
Finishing Material Filtration Cone Test – Calibration & Preventative Maintenance SOP

1.0 Maintenance Objective & Frequency

The objective of this procedure is to verify the integrity and calibration of the finishing material filtration cone assembly. This test ensures that the cone is correctly seated, free of wear or deformation, and that the filtration system maintains the required pressure differential to prevent bypass of unfiltered material. A properly functioning filtration cone is critical to achieving consistent finish quality and avoiding defects such as pinholes, fisheyes, or contamination in the final coating.

This test shall be performed weekly (every 40 operating hours) or whenever a change in filtration performance is suspected. Additionally, the cone must be tested after any filter media replacement, system pressure adjustment, or cone disassembly.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect and lock out the main power supply to the finishing material pump and any associated control panels. Verify zero energy state with a qualified electrician.
- **Pneumatic Isolation:** Close the pneumatic supply valve to the filtration system. Bleed all residual air from the system using the manual bleed valve. Confirm zero pressure on the gauge.
- **Hydraulic Isolation:** If the system uses hydraulic assist, isolate and lock out the hydraulic power unit. Depressurize the hydraulic lines per OEM procedure.
- **Mandatory PPE:** Safety glasses with side shields, chemical-resistant gloves (nitrile or neoprene), steel-toed boots, and a full-face shield when handling finishing materials. Ensure adequate ventilation or wear a NIOSH-approved respirator if vapors are present.
- **Spill Containment:** Position drip trays or absorbent pads beneath the filtration cone area before opening any connections.

3.0 Required Tools, Parts & Lubricants

- Digital pressure gauge (0–100 psi, $\pm 0.5\%$ accuracy) with NPT adapter
- Calibrated flow meter (0–10 GPM, $\pm 1\%$ accuracy)
- Cone test fixture (OEM-specified, with sealing O-rings)
- Torque wrench (0–50 in-lb, calibrated within 12 months)
- 5 mm hex key (Allen key)
- Clean lint-free wipes (Kimwipes or equivalent)
- Replacement O-ring kit for cone assembly (Viton or Buna-N as per OEM)
- Finishing material sample (same as production batch, 1 liter)
- Graduated cylinder (1000 mL)
- Stopwatch or timer (resolution 0.1 seconds)
- ServiceGrid mobile device or tablet for digital sign-off

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Confirm zero energy state and attach personal lock and tag. Verify that the finishing material pump is isolated and the system is fully depressurized.
2. Remove the access cover or guard from the filtration cone housing using a 5 mm hex key. Place all fasteners in a clean container to prevent loss.
3. Visually inspect the cone assembly for signs of wear, cracking, deformation, or material buildup. Check the O-ring groove and sealing surfaces for nicks or scratches. If damage is found, replace the cone and O-rings before proceeding.
4. Clean the cone and housing interior with lint-free wipes and a solvent compatible with the finishing material. Ensure no residue remains that could affect sealing or flow.
5. Install the cone test fixture in place of the standard cone. Ensure the O-ring is properly seated and lubricated with a thin film of compatible grease (e.g., silicone grease for Buna-N). Torque the retaining bolts to 25 in-lb in a star pattern.
6. Connect the digital pressure gauge to the test port on the fixture. Connect the flow meter in series with the outlet line. Ensure all connections are tight and leak-free.
7. Remove LOTO and restore power to the finishing material pump. Set the pump to the standard operating pressure (typically 40 psi, refer to OEM spec). Allow the system to stabilize for 30 seconds.
8. Open the test valve fully and measure the flow rate using the graduated cylinder and stopwatch. Collect material for exactly 60 seconds. Record the volume collected in milliliters. The flow rate should be within $\pm 5\%$ of the OEM-specified value (e.g., 3.5 L/min). If outside tolerance, proceed to Step 9.
9. If flow rate is out of tolerance, check for blockages in the test fixture, verify pump pressure, and inspect the cone housing for internal damage. If no issues found, replace the cone assembly with a new OEM part and repeat the test.
10. After successful flow test, close the test valve, stop the pump, and perform LOTO again. Remove the test fixture and reinstall the standard filtration cone. Torque retaining bolts to 25 in-lb in a star pattern. Reinstall the access cover and torque to 15 in-lb.
11. Remove LOTO and restore the system to normal operation. Run the finishing material pump for 2 minutes at operating pressure. Check all connections for leaks using a leak detection spray or soapy water. Verify that the pressure gauge reads within ± 2 psi of the setpoint.
12. Dispose of the collected test material according to facility hazardous waste procedures. Clean all tools and store them in the designated maintenance area.

5.0 Verification & Return to Service

1. Perform a production run on a test piece or scrap material. Inspect the finish for any defects (pinholes, fisheyes, contamination). The finish must match the quality standard of a known good batch.
2. Monitor the system pressure gauge for 10 minutes of continuous operation. Pressure must remain stable within ± 2 psi of the setpoint without fluctuation.
3. Check the filtration cone housing for any signs of leakage or weeping. If any leak is detected, tighten the retaining bolts incrementally (1 in-lb at a time) until leak stops, not to exceed 30 in-lb.
4. Record the test results in ServiceGrid: flow rate (mL/min), pressure (psi), cone condition (pass/fail), and any corrective actions taken. Attach a photo of the pressure gauge reading if possible.
5. Sign off on the PM work order in ServiceGrid. Update the equipment maintenance history with the next scheduled test date (7 days from completion).

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.