

Stain Wipe Off Uniformity Check – Calibration & Verification SOP

1.0 Maintenance Objective & Frequency

The objective of this procedure is to verify and calibrate the uniformity of stain wipe-off across the full width of the finishing line. Inconsistent wipe-off leads to visible streaks, blotches, and color variation, resulting in high rework and scrap rates. This PM ensures that all wiper blades, pressure rollers, and applicator heads are applying consistent contact force and that the wiping medium (cloth, felt, or foam) is free of contamination or wear. The frequency is every 40 production hours or weekly, whichever comes first, and immediately after any blade or roller change.

2.0 Lockout/Tagout (LOTO) & Safety

- Electrical Isolation: Disconnect main power to the finishing conveyor and wipe-off station. Apply personal lock and tag.
- Pneumatic Isolation: Close the compressed air supply valve to the wipe-off station. Bleed residual air from the pressure regulators and actuators.
- Hydraulic Isolation: If the system uses hydraulic pressure for roller adjustment, isolate the hydraulic pump and relieve system pressure per OEM procedure.
- Mandatory PPE: Safety glasses with side shields, cut-resistant gloves (ANSI A4 or higher), and steel-toed boots. If handling solvent-based stains, add chemical-resistant gloves (nitrile or neoprene) and a face shield.
- Lockout Verification: Attempt a start-up cycle from the main control panel to confirm zero energy state before proceeding.

3.0 Required Tools, Parts & Lubricants

- Digital force gauge (0-50 N range, ± 0.1 N accuracy) with a flat contact pad
- Feeler gauge set (0.05 mm to 1.0 mm)
- Precision straightedge (600 mm length, ground edge)
- White lint-free test cloth (100 mm x 100 mm squares, 10 pieces)
- Standardized test stain (same batch as production, 500 mL in a clean container)
- Isopropyl alcohol (99%) and clean rags for cleaning wiper surfaces
- Replacement wiper blades (if worn or damaged)
- Replacement felt/foam pads (if applicable)
- Torque wrench (0-10 Nm range, 0.1 Nm resolution)
- Digital caliper (150 mm, 0.01 mm resolution)
- ServiceGrid mobile device or tablet for digital sign-off

4.0 Step-by-Step Maintenance Procedure

1. Perform full LOTO as per Section 2.0. Verify zero energy state by attempting a start cycle from the main control panel.
2. Remove all guards and access panels covering the wipe-off station. Place them in a clean, designated area.

3. Visually inspect all wiper blades, rollers, and pads for signs of wear, cracking, glazing, or contamination. Replace any components that show damage or uneven wear patterns. Document findings in ServiceGrid.
4. Clean all wiper blade edges, roller surfaces, and pad contact areas using isopropyl alcohol and a clean rag. Ensure no residue or dried stain remains. Allow surfaces to air dry completely (approximately 2 minutes).
5. Using the precision straightedge and feeler gauge, check the parallelism of the wiper blade assembly relative to the conveyor bed. Measure at three points: left, center, and right. The gap must be within ± 0.1 mm across the full width. If out of spec, adjust the blade mounting brackets and re-check.
6. Using the digital force gauge, measure the contact force of each wiper blade or pressure roller against a clean test surface. Apply the gauge perpendicular to the blade/roller at three positions (left, center, right). Record the force in Newtons. The acceptable range is 8.0 N to 12.0 N. If any reading is outside this range, adjust the pneumatic pressure regulator or mechanical spring tension accordingly. Re-measure after adjustment.
7. Prepare the standardized test stain. Apply a uniform wet film of stain to a clean white test cloth using a consistent applicator (e.g., a 75 mm wide foam brush). The wet film thickness should be $0.15 \text{ mm} \pm 0.02 \text{ mm}$, verified with a wet film gauge.
8. Manually feed the stained test cloth through the wipe-off station at the standard production speed (simulate by hand at a steady rate of approximately 0.5 m/s). Collect the wiped cloth and visually inspect for uniformity. The wiped area should show an even, streak-free appearance with no visible lighter or darker patches. Repeat this test at three different positions across the width of the station (left, center, right).
9. If any test cloth shows non-uniformity (streaks, blotches, or uneven color), re-check the blade parallelism (Step 5) and contact force (Step 6). Also inspect the wiping medium for contamination or saturation. Replace the medium if necessary and repeat the test.
10. Once all test cloths pass the visual uniformity check, torque all blade and roller mounting bolts to the OEM specification (typically $5.5 \text{ Nm} \pm 0.5 \text{ Nm}$). Use the torque wrench to ensure consistent clamping force.
11. Reinstall all guards and access panels. Ensure all fasteners are tightened and safety interlocks are engaged.

5.0 Verification & Return to Service

1. Remove all LOTO devices and restore power, pneumatic, and hydraulic supplies in the reverse order of isolation.
2. Run a production test cycle using a standard production panel (or test panel) at normal line speed. Observe the wipe-off station during operation for any abnormal noise, vibration, or visible non-uniformity.
3. Inspect the finished test panel under standard lighting (D65 illuminant, 45/0 geometry) for any streaks, blotches, or color variation. The panel must meet the production quality standard (e.g., $\Delta E < 1.0$ from the approved color standard).
4. If the test panel passes quality inspection, sign off on the PM work order in ServiceGrid. Record all force measurements, parallelism gaps, and any component replacements in the maintenance log.
5. If the test panel fails, repeat the calibration procedure from Step 4. If the issue persists, escalate to the maintenance supervisor for further diagnosis (e.g., worn conveyor bearings, misaligned drive rollers).

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.