

Edgebander Hot Air Blower Nozzle Alignment & Calibration SOP

1.0 Maintenance Objective & Frequency

The objective of this procedure is to verify and adjust the alignment of the hot air blower nozzle relative to the edgebanding material and workpiece. Proper alignment ensures uniform heat distribution for adhesive activation, preventing cold spots, banding defects, and premature nozzle wear. This PM is to be performed every 500 operating hours or quarterly, whichever comes first, and immediately after any reported adhesive activation issues.

2.0 Lockout/Tagout (LOTO) & Safety

- Electrical Isolation: Disconnect the edgebander main power supply and apply a personal lockout tagout device.
- Pneumatic Isolation: Close the compressed air supply valve to the machine and bleed any residual pressure from the pneumatic lines.
- Thermal Hazard: Allow the hot air blower and nozzle to cool to ambient temperature (minimum 30 minutes after shutdown) before handling. Verify with a non-contact infrared thermometer.
- PPE: Wear safety glasses, heat-resistant gloves (rated for 200°C), and steel-toed boots. Ensure the work area is clear of combustible materials.

3.0 Required Tools, Parts & Lubricants

- 4mm hex key (Allen key)
- 6mm hex key (Allen key)
- Digital caliper (0-150mm, resolution 0.01mm)
- Feeler gauge set (0.05mm to 1.0mm)
- Non-contact infrared thermometer (range -50°C to 500°C)
- Torque wrench (5-25 Nm range, with 6mm hex bit)
- Clean lint-free cloths
- Isopropyl alcohol (99% concentration) for cleaning nozzle face
- Replacement nozzle gasket (if applicable, per OEM part number)

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Confirm the hot air blower is cool to the touch using the infrared thermometer.
2. Remove the nozzle guard and any protective covers using the 4mm hex key. Set aside fasteners in a clean container.
3. Visually inspect the nozzle face for carbon buildup, cracks, or deformation. Clean the nozzle face with isopropyl alcohol and a lint-free cloth. Replace nozzle if damage is found.

4. Using the digital caliper, measure the distance from the nozzle tip to the edgebanding material reference surface (typically the pressure roller face). Record the measurement. The OEM specification is 2.0mm $\pm$ 0.2mm. If out of tolerance, proceed to step 5.
5. Loosen the two M6 mounting bolts on the nozzle bracket using the 6mm hex key. Do not remove them completely.
6. Adjust the nozzle position by sliding the bracket forward or backward. Use the feeler gauge to set the gap between the nozzle tip and the reference surface to exactly 2.0mm. Verify with the digital caliper.
7. Tighten the M6 mounting bolts to 12 Nm using the torque wrench with the 6mm hex bit. Re-check the gap with the feeler gauge to ensure it did not shift during tightening.
8. Check the lateral alignment (side-to-side) of the nozzle relative to the edgebanding strip. The nozzle should be centered over the strip width. Use the caliper to measure the distance from the nozzle edge to the strip edge on both sides. Adjust if necessary by loosening the lateral adjustment screws (if equipped) and re-tightening to 8 Nm.
9. Inspect the nozzle angle relative to the workpiece. The nozzle should be parallel to the workpiece surface within 0.5° (use a machinist's square or digital protractor). If misaligned, loosen the pivot bolt, adjust, and re-torque to 10 Nm.
10. Reinstall the nozzle guard and all protective covers. Tighten fasteners to 4 Nm using the 4mm hex key.
11. Remove LOTO devices. Restore compressed air and electrical power to the machine.
12. Set the hot air blower to the standard operating temperature (typically 180°C for PVC edgebanding). Allow the system to stabilize for 5 minutes.

5.0 Verification & Return to Service

1. Using the infrared thermometer, measure the temperature at three points across the nozzle face. The temperature variation should not exceed $\pm 5^{\circ}\text{C}$. If variation is greater, re-check nozzle alignment and clean the nozzle face.
2. Run a test piece of edgebanding material through the machine at standard feed speed (typically 12-15 m/min). Inspect the adhesive activation: the glue line should be uniformly melted without scorching or cold spots.
3. Perform a peel test on the test piece. The edgeband should not peel off with moderate hand force. If adhesion is weak, re-check nozzle gap and temperature settings.
4. Record the alignment measurements (gap, lateral offset, angle) and test results in the PM work order within ServiceGrid. Sign off the work order as completed.
5. Return the machine to production. Monitor the first 10 production pieces for any banding defects. If defects appear, re-inspect the nozzle alignment immediately.

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.