

Hopper Dryer Desiccant Replacement and Filter Cleaning SOP

1.0 Maintenance Objective & Frequency

The objective of this procedure is to replace the desiccant media in the hopper dryer's regeneration bed and clean all intake and exhaust filters. This ensures the dryer maintains its rated dew point (typically -40°C), prevents moisture contamination of hygroscopic resins, and reduces energy consumption from clogged filters. Perform this PM every 6 months (or per OEM recommendation, typically after 3,000 operating hours).

2.0 Lockout/Tagout (LOTO) & Safety

- Electrical Isolation: Disconnect the hopper dryer from its main power supply at the disconnect switch. Apply a personal lock and tag.
- Thermal Hazard: Allow the dryer to cool for at least 30 minutes after shutdown. Regeneration temperatures can exceed 200°C . Verify surface temperature is below 40°C using an infrared thermometer before opening any access panels.
- Mandatory PPE: Wear safety glasses, heat-resistant gloves (rated for 250°C), and a dust mask (N95) when handling desiccant media.

3.0 Required Tools, Parts & Lubricants

- Replacement desiccant media (molecular sieve, 4A or 13X type, per OEM spec – e.g., 5 kg bag)
- Replacement intake filter element (pleated paper or polyester, OEM part number)
- Replacement exhaust filter element (same as intake, if applicable)
- Shop vacuum with HEPA filter and crevice tool
- Infrared thermometer (non-contact, range -50°C to 500°C)
- Torque wrench (0-30 Nm range) with appropriate socket (e.g., 10mm hex)
- Screwdrivers (flathead and Phillips #2)
- Clean, lint-free rags
- Disposable gloves (nitrile)

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Confirm zero energy state by attempting to start the dryer (it should not power on).
2. Allow the dryer to cool for a minimum of 30 minutes. Use the infrared thermometer to verify that all external surfaces and the regeneration bed access door are below 40°C .
3. Open the regeneration bed access door (typically located on the side or rear of the dryer). Use a screwdriver if the latch is spring-loaded. Carefully remove the door and set it aside.

4. Vacuum out the old desiccant media from the regeneration chamber using the shop vacuum with crevice tool. Ensure all beads are removed. Inspect the chamber for any signs of oil contamination, cracking, or rust. If contamination is present, clean with a lint-free rag and isopropyl alcohol (allow to dry fully before refilling).
5. Fill the regeneration chamber with new desiccant media. Pour slowly to avoid bridging. Fill to the manufacturer's indicated fill line (typically 1 inch below the top of the chamber). Do not overfill, as this can restrict airflow.
6. Reinstall the regeneration bed access door. Tighten the retaining bolts in a crisscross pattern to 10 Nm using the torque wrench. Do not overtighten, as the door gasket can deform.
7. Locate the intake filter housing (usually on the side of the dryer near the blower). Remove the filter cover by unscrewing the retaining screws. Extract the old filter element and discard it.
8. Vacuum the interior of the filter housing to remove any dust or debris. Install the new intake filter element, ensuring it seats properly against the gasket. Reinstall the filter cover and tighten screws to 5 Nm.
9. Repeat steps 7 and 8 for the exhaust filter housing (typically located on the top or rear of the dryer).
10. Inspect all hoses and connections for cracks, leaks, or loose clamps. Tighten any loose hose clamps to 3 Nm. Replace any damaged hoses as needed.
11. Remove all tools, rags, and debris from the work area. Close and secure all access panels.

5.0 Verification & Return to Service

1. Remove LOTO devices. Restore power to the hopper dryer.
2. Start the dryer and allow it to run through one complete regeneration cycle (typically 30-60 minutes). Monitor the controller for any fault codes.
3. Using a dew point meter (if available), verify that the outlet air dew point reaches the target value (e.g., -40°C) within two regeneration cycles. If not, check for air leaks or insufficient desiccant fill.
4. Check that the intake and exhaust airflow is unobstructed. Listen for unusual noises from the blower. Confirm that the regeneration heater cycles on and off as expected.
5. Sign off on the PM work order in ServiceGrid, noting the date, desiccant lot number, and any observations (e.g., filter condition, chamber cleanliness).

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.