
Building HVAC Air Handling Unit (AHU) Belt Tension and Alignment PM

1.0 Maintenance Objective & Frequency

The objective of this procedure is to inspect, measure, and adjust the belt tension and pulley alignment on the AHU fan and motor drive system. Proper belt tension and alignment prevent belt slippage, reduce vibration, extend belt and bearing life, and maintain design airflow. This PM is to be performed every 3 months (quarterly) or at 2000 operating hours, whichever comes first.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Lock out and tag out the AHU disconnect switch at the motor control center (MCC) or local disconnect. Verify zero voltage with a rated voltmeter.
- **Mechanical Isolation:** Ensure the fan wheel has come to a complete stop before opening access doors.
- **PPE:** Safety glasses, cut-resistant gloves, hearing protection (if ambient noise >85 dBA), and steel-toed boots.
- **Confined Space:** If entering the AHU plenum, follow confined space entry procedures per local regulations.

3.0 Required Tools, Parts & Lubricants

- Belt tension gauge (e.g., Gates 7401-0020 or equivalent sonic tension meter)
- Straightedge (at least 36 inches long) or laser alignment tool
- Wrenches: combination wrenches (metric or SAE as required for motor base bolts and jacking bolts)
- Socket set with ratchet and extension
- Torque wrench (range to cover motor mounting bolt specs)
- Replacement belts (matched set, OEM part number verified)
- Penetrating oil (e.g., WD-40 or equivalent)
- Rags and parts cleaning solvent
- Flashlight or inspection light

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Verify power is off and fan wheel is stationary.
2. Open the AHU access door or belt guard. Inspect the belt guard for damage and ensure it is secure. Remove guard if necessary for access.
3. Visually inspect belts for cracks, fraying, glazing, or uneven wear. If any belt shows significant wear, replace the entire set of belts (matched set).
4. Check pulley (sheave) condition: look for worn grooves, pitting, or rust. Clean grooves with a wire brush if debris is present.

5. Measure belt tension using a sonic tension meter: pluck the belt and record the frequency. Compare to OEM specifications (typical range for A/B section belts: 40-60 Hz at recommended deflection force). Adjust tension as needed.
6. To adjust tension: loosen motor mounting bolts (base bolts and slide rail bolts) using appropriate wrenches. Turn the jacking bolt (if equipped) to move the motor away from the fan until correct tension is achieved. Tighten motor bolts to OEM torque specification (e.g., 30-50 ft-lbs for typical NEMA frame).
7. Check pulley alignment: place a straightedge across the face of both pulleys (fan and motor). The straightedge should contact both pulley faces evenly. If not, loosen the motor pulley set screw and slide the pulley on the motor shaft to align. Re-tighten set screw to OEM torque (e.g., 8-12 ft-lbs for small pulleys).
8. For V-belt drives, verify that the belts are seated properly in the grooves and that the top of the belt is flush with or slightly below the top of the pulley groove (not riding high).
9. Re-check belt tension after alignment adjustment. Re-tension if necessary. Ensure all hardware is torqued to spec.
10. Reinstall belt guard and secure all fasteners. Ensure no pinch points or clearance issues exist.
11. Remove LOTO tags and locks. Restore power to the AHU.

5.0 Verification & Return to Service

1. Start the AHU and let it run for 5 minutes. Listen for unusual noise (squealing, chirping, or rubbing).
2. Check for excessive vibration by placing a hand on the motor and fan housing. If vibration is present, stop and re-check alignment and tension.
3. Measure motor amperage with a clamp meter and compare to nameplate FLA. Ensure current draw is within 10% of normal operating range.
4. Verify that the AHU is delivering design airflow (check static pressure or airflow station if available).
5. Document all readings (tension frequency, amperage, alignment condition) in the PM work order within ServiceGrid. Note any replaced parts or adjustments made.
6. Sign off on the PM work order and return the AHU to normal service.

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.