Dust Collector Stack Emission Opacity Test

1.0 Maintenance Objective & Frequency

The objective of this procedure is to perform a visual opacity test on the dust collector stack emissions to verify that the filter media is intact and the collection system is operating within acceptable emission limits. This test ensures compliance with local environmental regulations and prevents fugitive dust emissions that could lead to fines or equipment damage.

Frequency: Weekly or as required by local environmental permits. Perform immediately after any filter change, baghouse repair, or if visible emissions are suspected.

2.0 Lockout/Tagout (LOTO) & Safety

- Electrical Isolation: Lock out the main disconnect for the dust collector fan motor. Verify zero energy with a voltmeter.
- Pneumatic Isolation: If the dust collector uses compressed air for pulse-jet cleaning, isolate and bleed the air supply at the manifold.
- Mechanical Isolation: Ensure the dust collector hopper discharge valve is locked in the closed position to prevent accidental material release.
- PPE: Safety glasses, hard hat, steel-toed boots, hearing protection (if fan is running), and a dust mask or respirator if dust is present.
- Confined Space: Do not enter the stack or dust collector housing. This test is performed externally.

3.0 Required Tools, Parts & Lubricants

- Opacity observation ring or calibrated opacity chart (e.g., Ringelmann chart or digital opacity meter)
- Stopwatch or timer (for timed observation)
- Flashlight or high-intensity light source (for nighttime or low-light conditions)
- Camera with timestamp (optional, for documentation)
- Lockout/tagout kit (padlock, hasp, tag)
- Voltmeter (for LOTO verification)
- Dust mask or respirator (if required)

4.0 Step-by-Step Maintenance Procedure

1. Perform lockout/tagout on the dust collector fan motor and any associated pneumatic systems. Verify zero energy state with a voltmeter.
2. Inspect the stack outlet for any visible obstructions, bird nests, or debris that could affect airflow. Remove any obstructions found.
3. Select an observation point that provides a clear, unobstructed view of the stack outlet against a contrasting background (e.g., sky, building). Avoid direct sunlight into the observer's eyes.

4. Remove the lockout/tagout from the fan motor only. Do not re-energize pneumatic systems yet. Start the fan motor and allow it to reach full operating speed (approximately 2-3 minutes).

5. Position yourself at the observation point. Hold the opacity observation ring or chart at arm's length, aligning it with the stack outlet.

6. Observe the stack emissions continuously for a period of 60 seconds. Note the maximum opacity (density of the plume) observed during that period. Use the opacity chart to estimate the percentage of opacity (0% = clear, 100% = completely opaque).

7. Record the opacity reading in the maintenance log. If opacity exceeds 20% (or the local regulatory limit), note the condition and proceed to step 8. If opacity is within limits, proceed to step 9.

8. If opacity is excessive, stop the fan and re-apply LOTO. Inspect the filter bags or cartridges for tears, holes, or improper seating. Replace or repair as necessary. Repeat the opacity test after repairs.

9. If opacity is acceptable, stop the fan and re-apply LOTO. Re-energize the pneumatic system (if applicable) and verify proper pulse-jet cleaning cycle operation.

10. Remove all LOTO devices. Restore the dust collector to normal operation. Ensure the hopper discharge valve is unlocked and operational.

5.0 Verification & Return to Service

1. Run the dust collector under normal production load for at least 10 minutes.

2. Perform a final visual opacity check from the same observation point. Confirm opacity is within acceptable limits (typically less than 20% or as per local regulations).

3. Document the test results in the maintenance log or CMMS (ServiceGrid), including date, time, opacity reading, observer name, and any corrective actions taken.

4. Sign off on the PM work order in ServiceGrid and notify the production supervisor that the dust collector is cleared for operation.