

# Dust Collector Spark Detection System Test

## 1.0 Maintenance Objective & Frequency

The objective of this procedure is to verify the functionality of the spark detection system installed on the dust collector ductwork. This includes testing the infrared (IR) sensors, control panel alarm logic, and the deluge valve activation for the water-based extinguishing system. A fully operational system is critical to prevent downstream fires or explosions in the dust collection hopper or filter cartridges.

This test shall be performed weekly to ensure the system remains in a state of readiness. Additional testing is required after any maintenance or modification to the dust collection system or spark detection components.

## 2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect main power to the dust collector fan motor and lock out the disconnect switch. Verify zero energy state with a voltmeter.
- **Pneumatic Isolation:** Close the compressed air supply valve to the deluge valve actuator and bleed any residual pressure from the line.
- **Process Isolation:** Ensure the dust collector is empty of combustible dust. If necessary, perform a clean-out of the hopper and ductwork near the sensors before testing.
- **Mandatory PPE:** Safety glasses, hearing protection, flame-resistant coveralls, and steel-toed boots. Have a fire extinguisher rated for Class A and C fires within arm's reach.

## 3.0 Required Tools, Parts & Lubricants

- Spark detection system manufacturer's test kit (includes simulated spark source or IR test lamp)
- Multimeter with temperature probe (for verifying sensor calibration)
- Adjustable wrench (for deluge valve manual override test)
- Clean lint-free cloth and isopropyl alcohol (for cleaning sensor lenses)
- Control panel key (if applicable) to access test mode
- Replacement desiccant bags for sensor housings (if moisture ingress is observed)

## 4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO on the dust collector fan motor and compressed air supply to the deluge valve. Confirm zero energy state.
2. Access the spark detection control panel. Switch the system to 'Test Mode' using the panel key or menu to prevent accidental water discharge during testing.
3. Visually inspect each IR sensor head for physical damage, loose mounting, or debris blocking the lens. Clean the lens with isopropyl alcohol and a lint-free cloth if necessary.
4. Using the manufacturer's test kit (IR test lamp or simulated spark source), activate the test device in front of each sensor at the specified distance (typically 6-12 inches). Observe the control panel for the corresponding alarm signal.

5. Verify that the control panel displays the correct sensor ID and alarm type (e.g., 'Spark Detected - Sensor 1'). If no alarm is received, check wiring continuity and sensor power supply voltage (should be 24 VDC  $\pm$ 10%).
6. While the test signal is active, confirm that the control panel activates the alarm relay and that the deluge valve solenoid receives a 24 VDC signal. Use a multimeter to check voltage at the solenoid terminals.
7. Manually test the deluge valve by slowly opening the manual override lever (if equipped) for 2 seconds to confirm water flow to the extinguishing nozzles. Collect discharged water in a bucket to avoid floor damage.
8. Reset the control panel alarm and exit test mode. Verify that the system returns to 'Standby' status with no active alarms.
9. Check the compressed air supply pressure to the deluge valve actuator. It should be between 80-100 PSI as per OEM spec. Adjust the regulator if needed.
10. Inspect all wiring connections for corrosion or loose terminals. Tighten any loose connections and apply dielectric grease to exposed terminals in high-humidity environments.

## 5.0 Verification & Return to Service

1. Remove all LOTO devices and restore power to the dust collector fan motor and compressed air supply.
2. Start the dust collector and allow it to reach normal operating airflow. Confirm that the spark detection system remains in 'Standby' mode with no false alarms.
3. Perform a final functional test by activating the test lamp at one sensor while the system is live. Confirm the alarm sounds and the deluge valve solenoid energizes (without water discharge if test mode is re-engaged briefly).
4. Document the test results in the PM work order, including sensor IDs tested, alarm response times, and any corrective actions taken. Sign off in ServiceGrid.

**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.