

# Duct Smoke Detectors

Methods of installation, testing,  
inspection and maintenance.

# Purpose

- To prevent the recirculation of dangerous quantities of smoke from the fan, filter, supply air or from a fire in another part of the building.

# When Required

- When required by the adopted mechanical code.
- NFPA 90A
- U.L. Standard 268A
- NFPA 92A & B
- NFPA 101
- IFC
- NFPA 90A states that duct smoke detectors are required downstream of the filter and before the first branch connection in air supply and distribution systems having a capacity greater than 2,000 cfm.

# Installation

- NFPA 72 2007 National Fire Alarm Code
- NFPA 72 A.5.14.5.2 The annex section provides installation instructions.
- NFPA 72 A.5.14.5.2 requires installation per the Manufacturer's instructions.
- 5.16.5.2\* Air duct detectors shall be installed in such a way as to obtain a representative sample of the air stream.
  - They can mounted in the duct, outside the duct with the element protruding into the duct, or through the duct with a projected light beam.

# Installation Continued

- 5.16.5.3 Detectors shall be mounted in accordance with the manufacturer's published instructions and shall be accessible for cleaning by providing access doors or control units in accordance with NFPA 90A.
- 5.16.5.6 Detectors shall be listed for operation over the complete range of air velocities, temperature, and humidity expected at the detector when the air-handling system is operating.
- 5.16.5.8 Where in-duct smoke detectors are installed in concealed locations more than 10ft above the finished floor or in arrangements where the detector's alarm or supervisory indicator is not visible to responding personnel, the detectors shall be provided with remote alarm or supervisory indication in a location acceptable to the authority having jurisdiction.

# Testing

- NFPA 72 2007 Chapter 10
  - Methods
    - Table 10.4.2.2 Air duct detectors shall be tested or inspected to ensure that the device will sample the airstream. The test shall be made in accordance with the manufacturer's published instructions.
- Frequency
  - NFPA 72 Table 10.4.4
    - Initial acceptance
    - Annually

# Testing Continued

- Proper testing should include the minimum
  - Introduction of smoke to the detector
  - Testing of the pressure differential between the tubes.
  - Testing of the air velocity in the duct.
  - Verification that the sampling tubes are installed correctly.
  - Verification that the duct detector is located in the correct location of the duct.
  - Verification that the proper signal is received at the fire alarm panel or the notification device.

# Maintenance

- Clean with a vacuum and a brush periodically to prevent nuisance alarms.
- Check sampling holes to make sure they are not plugged or dirty.
- Test the detectors sensitivity.

# References

- System Sensor Duct Application Smoke Detectors Application Guide.
- ASHRAE
- NFPA 72
- NFPA 90A
- NFPA 92A & 92B
- U.L. 268A
- The Moore-Wilson Signaling Report volume 11, No. 3 Pages 11, 12 & 13.