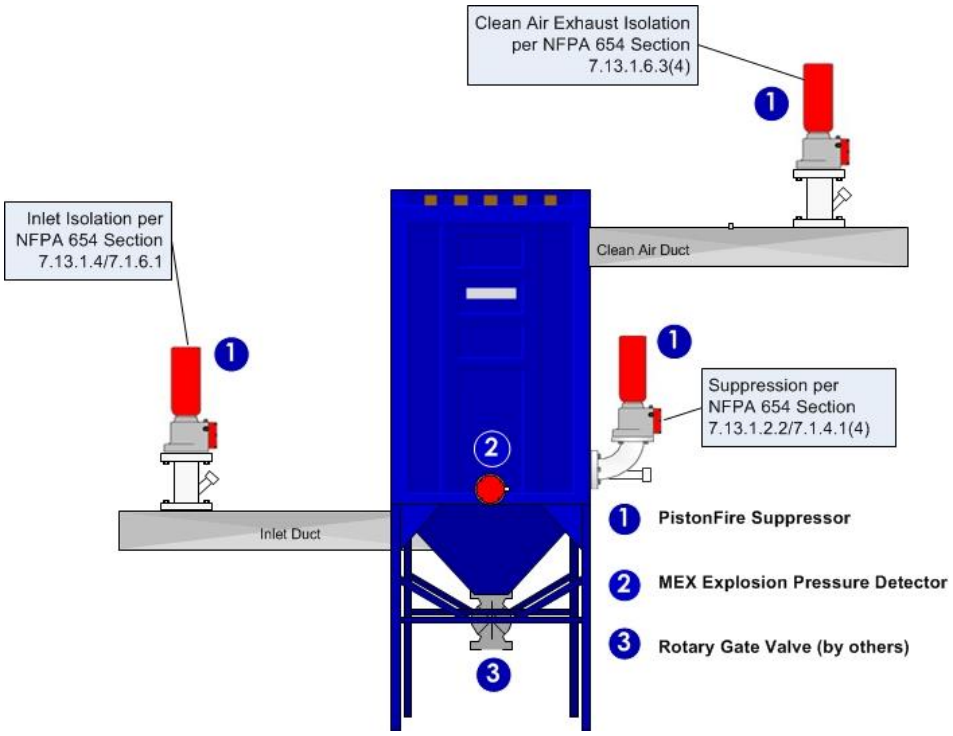
Air Material Separator Protection

Explosion Protection by Suppression and Inlet & Outlet Isolation per NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, 2013 Edition. Reference: OSHA Combustible Dust Directive NEP CPL 03-00-008.



Key Excerpts from NFPA 654, 2013 Edition[1]

7.1.4 Explosion Protection
7.1.4.1 The design of explosion protection for equipment shall incorporate one or more of the following methods of protection: (4) Deflagration suppression systems in accordance with NFPA 69.

7.1.6 Isolation of Equipment
7.1.6.1 Where an explosion hazard exists, isolation devices shall be provided to prevent deflagration propagation between connected equipment in accordance with NFPA 69.

7.13.1.2 Protection
7.13.1.2.2 Where an explosion hazard exists, air-material separators shall be protected in accordance with 7.1.4.
7.13.1.4 Isolation devices shall be provided for air-material separators in accordance with 7.1.6.

7.13.1.6 Exhaust Air
7.13.1.6.3 Recycling of air-material separator exhaust to buildings or rooms shall be permitted when all of the following requirements are met: (4) Provisions are incorporated to prevent the transmission of flame and pressure effects from a deflagration in an air-material separator back to the facility unless a process hazard analysis indicates that those effects do not pose a threat to the facility or the occupants.

Key Excerpts from NFPA 69, 2014 Edition[2]

10.4.2 (11.4.1) System Design Verification
10.4.2.1 (11.4.1.1) System design methodology and application range shall have been supported by appropriate testing and verified by an independent party acceptable to AHJ.
10.4.2.2 (11.4.1.2) The system design shall be based on testing relevant to the application.

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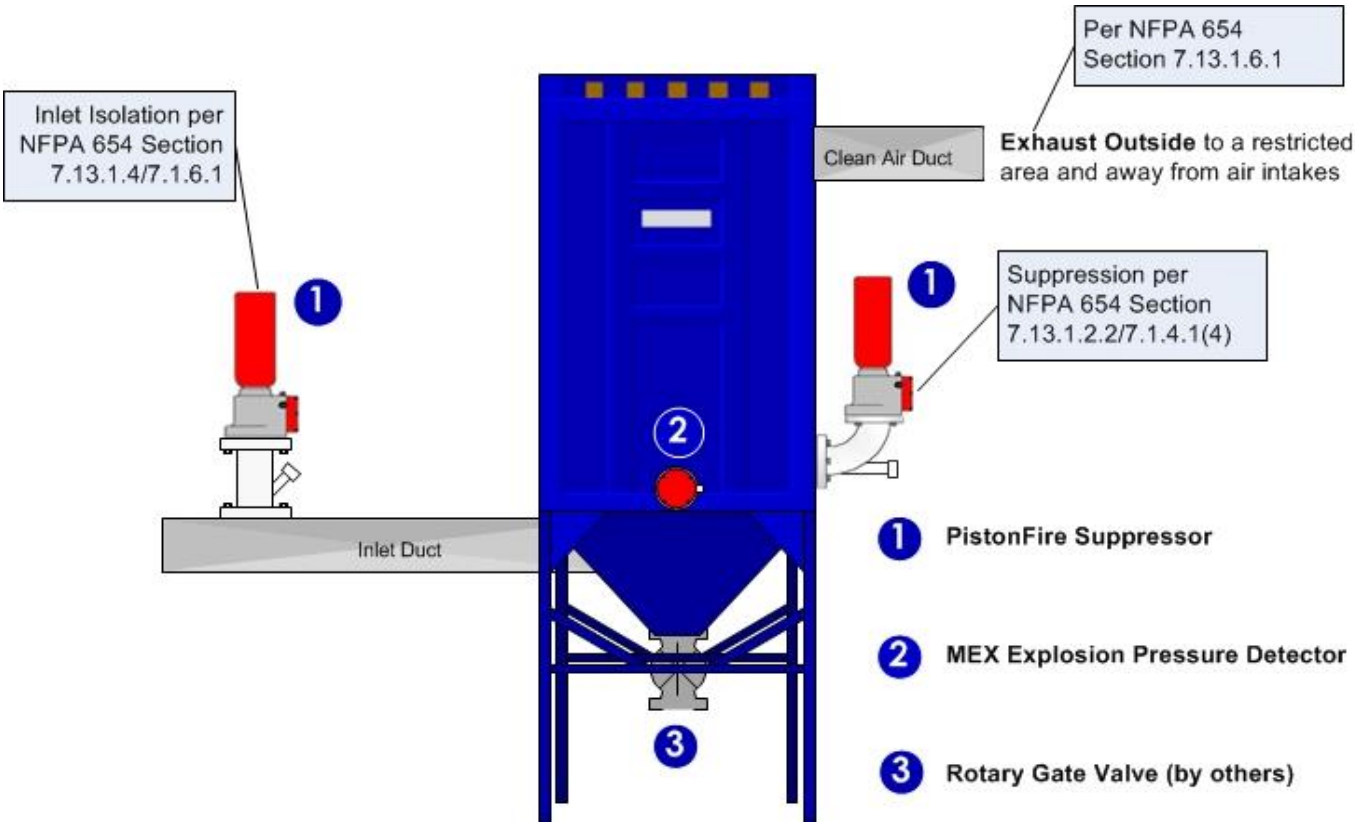

Key Excerpts from NFPA 654, 2013 Edition[1]

7.1.4 Explosion Protection
7.1.4.1 The design of explosion protection for equipment shall incorporate one or more of the following methods of protection: (4) Deflagration suppression systems in accordance with NFPA 69.

7.1.6 Isolation of Equipment
7.1.6.1 Where an explosion hazard exists, isolation devices shall be provided to prevent deflagration propagation between connected equipment in accordance with NFPA 69.

7.13.1.2 Protection
7.13.1.2.2 Where an explosion hazard exists, air-material separators shall be protected in accordance with 7.1.4.

7.13.1.4 Isolation devices shall be provided for air-material separators in accordance with 7.1.6.

7.13.1.6 Exhaust Air
7.13.1.6.1 Exhaust air from the final air-material separator shall be discharged outside to a restricted area and away from air intakes.

Key Excerpts from NFPA 69, 2014 Edition[2]

10.4.2 (11.4.1) System Design Verification
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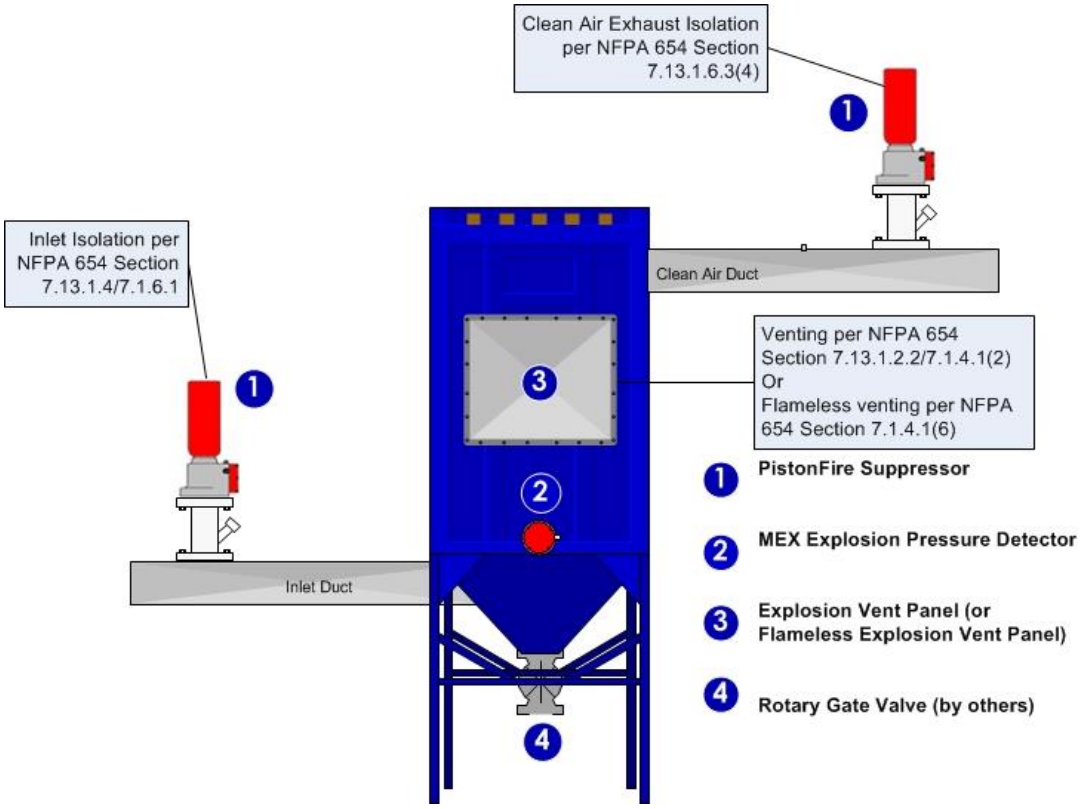

Key Excerpts from NFPA 654, 2013 Edition[1]

7.1.4 Explosion Protection
7.1.4.1 The design of explosion protection for equipment shall incorporate one or more of the following methods of protection: (2) Deflagration venting in accordance with NFPA 68 or (6) Deflagration venting through a listed dust retention and flame-arresting device.

7.1.6 Isolation of Equipment
7.1.6.1 Where an explosion hazard exists, isolation devices shall be provided to prevent deflagration propagation between connected equipment in accordance with NFPA 69.

7.13.1.2 Protection
7.13.1.2.2 Where an explosion hazard exists, air-material separators shall be protected in accordance with 7.1.4.
7.13.1.4 Isolation devices shall be provided for air-material separators in accordance with 7.1.6.

7.13.1.6 Exhaust Air
7.13.1.6.3 Recycling of air-material separator exhaust to buildings or rooms shall be permitted when all of the following requirements are met: (4) Provisions are incorporated to prevent the transmission of flame and pressure effects from a deflagration in an air-material separator back to the facility unless a process hazard analysis indicates that those effects do not pose a threat to the facility or the occupants.

Key Excerpts from NFPA 69, 2014 Edition[2]

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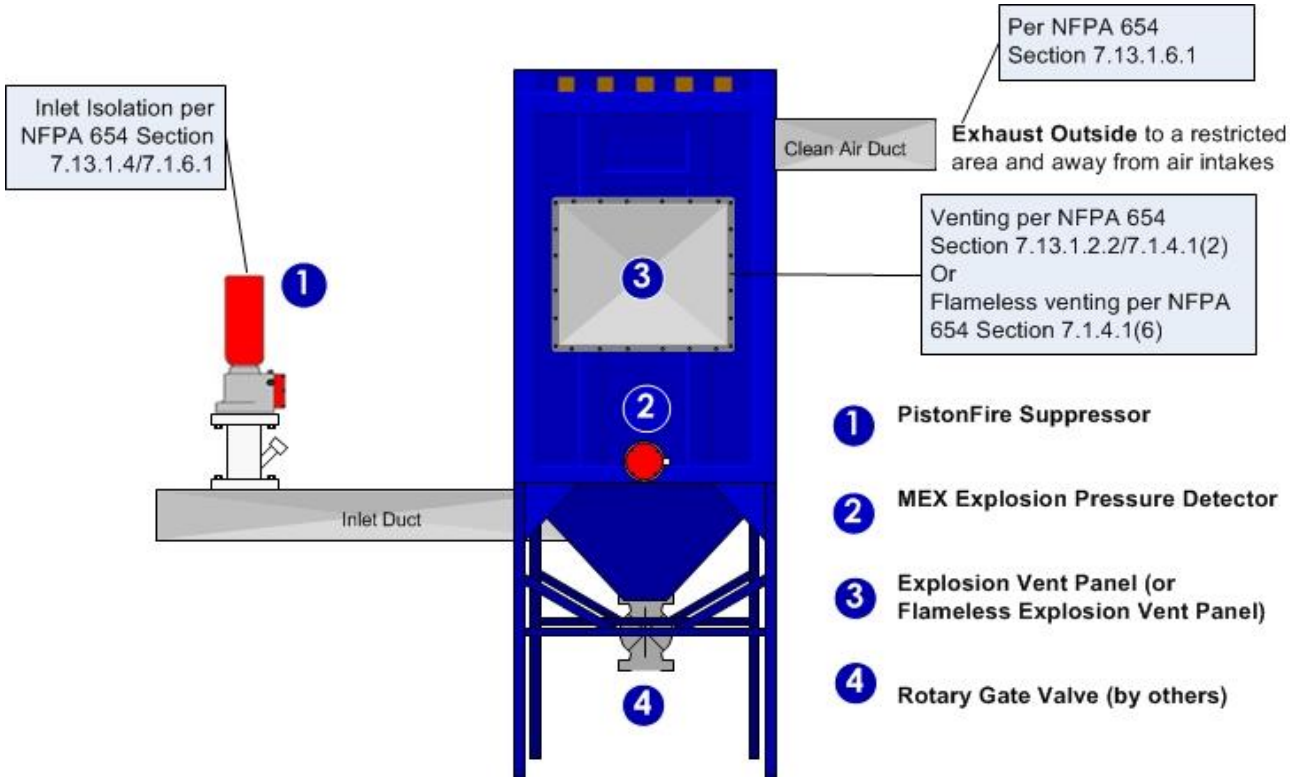

Key Excerpts from NFPA 654, 2013 Edition[1]

7.1.4 Explosion Protection
7.1.4.1 The design of explosion protection for equipment shall incorporate one or more of the following methods of protection: (2) Deflagration venting in accordance with NFPA 68 or (6) Deflagration venting through a listed dust retention and flame-arresting device.

7.1.6 Isolation of Equipment
7.1.6.1 Where an explosion hazard exists, isolation devices shall be provided to prevent deflagration propagation between connected equipment in accordance with NFPA 69.

7.13.1.2 Protection
7.13.1.2.2 Where an explosion hazard exists, air-material separators shall be protected in accordance with 7.1.4.

7.13.1.4 Isolation devices shall be provided for air-material separators in accordance with 7.1.6.

7.13.1.6 Exhaust Air
7.13.1.6.1 Exhaust air from the final air-material separator shall be discharged outside to a restricted area and away from air intakes.

Key Excerpts from NFPA 69, 2014 Edition[2]

10.4.2 (11.4.1) System Design Verification
10.4.2.1 (11.4.1.1) System design methodology and application range shall have been supported by appropriate testing and verified by an independent party acceptable to AHJ.
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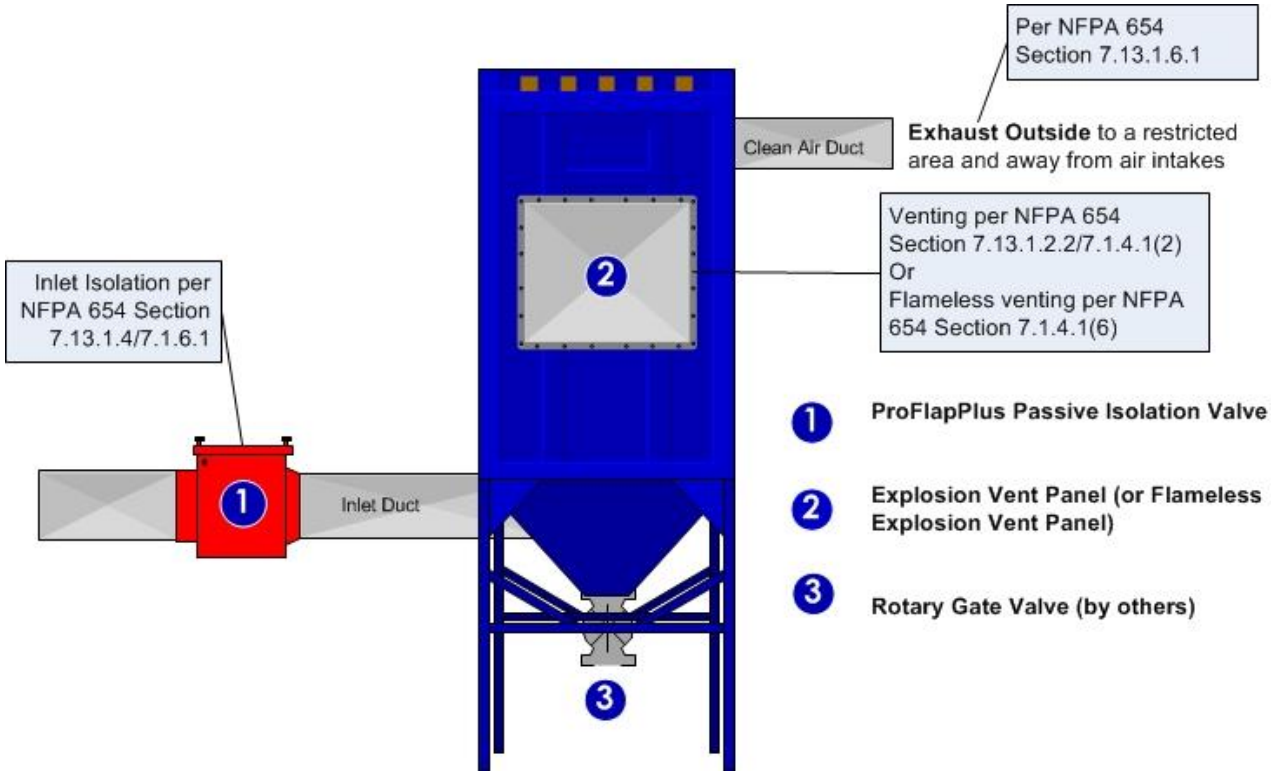

Key Excerpts from NFPA 654, 2013 Edition[1]

7.1.4 Explosion Protection
7.1.4.1 The design of explosion protection for equipment shall incorporate one or more of the following methods of protection: (2) Deflagration venting in accordance with NFPA 68 or (6) Deflagration venting through a listed dust retention and flame-arresting device.

7.1.6 Isolation of Equipment
7.1.6.1 Where an explosion hazard exists, isolation devices shall be provided to prevent deflagration propagation between connected equipment in accordance with NFPA 69
7.13.1.4 Isolation devices shall be provided for air-material separators in accordance with 7.1.6.

7.13.1.6 Exhaust Air
7.13.1.6.1 Exhaust air from the final air-material separator shall be discharged outside to a restricted area and away from air intakes.

7.13.1.2 Protection
7.13.1.2.2 Where an explosion hazard exists, air-material separators shall be protected in accordance with 7.1.4.

Key Excerpts from NFPA 69, 2014 Edition[2]

12.2.3.5 System Certification
12.2.3.5 (10.4.2.1.) The flow-actuated flap valve deflagration isolation system design methodology and application range shall be supported by appropriate testing and certified by a recognized testing organization acceptable to the authority having jurisdiction.
12.2.2.3 A performance demonstration shall determine the following: (1) Minimum and maximum location placement distances from the expected ignition source (2) Minimum and maximum K_{st} (3) Maximum number of flow direction changes (4) Maximum dust loading (5) Maximum air velocity (6) Range of allowable P_{red} within the protected enclosure where the ignition might occur.

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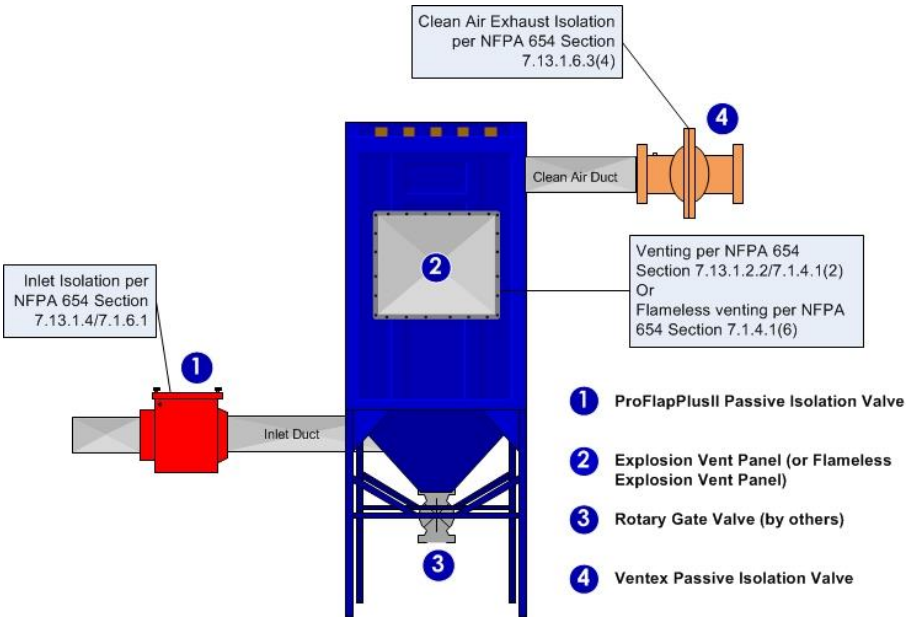

Key Excerpts from NFPA 654, 2013 Edition[1]

7.1.4 Explosion Protection
7.1.4.1 The design of explosion protection for equipment shall incorporate one or more of the following methods of protection: (2) Deflagration venting in accordance with NFPA 68 or (6) Deflagration venting through a listed dust retention and flame-arresting device.

7.1.6 Isolation of Equipment
7.1.6.1 Where an explosion hazard exists, isolation devices shall be provided to prevent deflagration propagation between connected equipment in accordance with NFPA 69.

7.13.1.2 Protection
7.13.1.2.2 Where an explosion hazard exists, air-material separators shall be protected in accordance with 7.1.4.
7.13.1.4 Isolation devices shall be provided for air-material separators in accordance with 7.1.6.

7.13.1.6 Exhaust Air
7.13.1.6.3 Recycling of air-material separator exhaust to buildings or rooms shall be permitted when all of the following requirements are met: (4) Provisions are incorporated to prevent the transmission of flame and pressure effects from a deflagration in an air-material separator back to the facility unless a process hazard analysis indicates that those effects do not pose a threat to the facility or the occupants.

Key Excerpts from NFPA 69, 2014 Edition[2]

12.2 System Certification
12.2.3.3 & 12.2.3.5 (10.4.2.1.) The float/flow-actuated flap valve deflagration isolation system design methodology and application range shall be supported by appropriate testing and certified by a recognized testing organization acceptable to the authority having jurisdiction.

12.2.2.3 A performance demonstration shall determine the following: (1) Minimum and maximum location placement distances from the expected ignition source (2) Minimum and maximum Kst (3) Maximum number of flow direction changes (4) Maximum dust loading (5) Maximum air velocity (6) Range of allowable Pred within the protected enclosure where the ignition might occur.

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