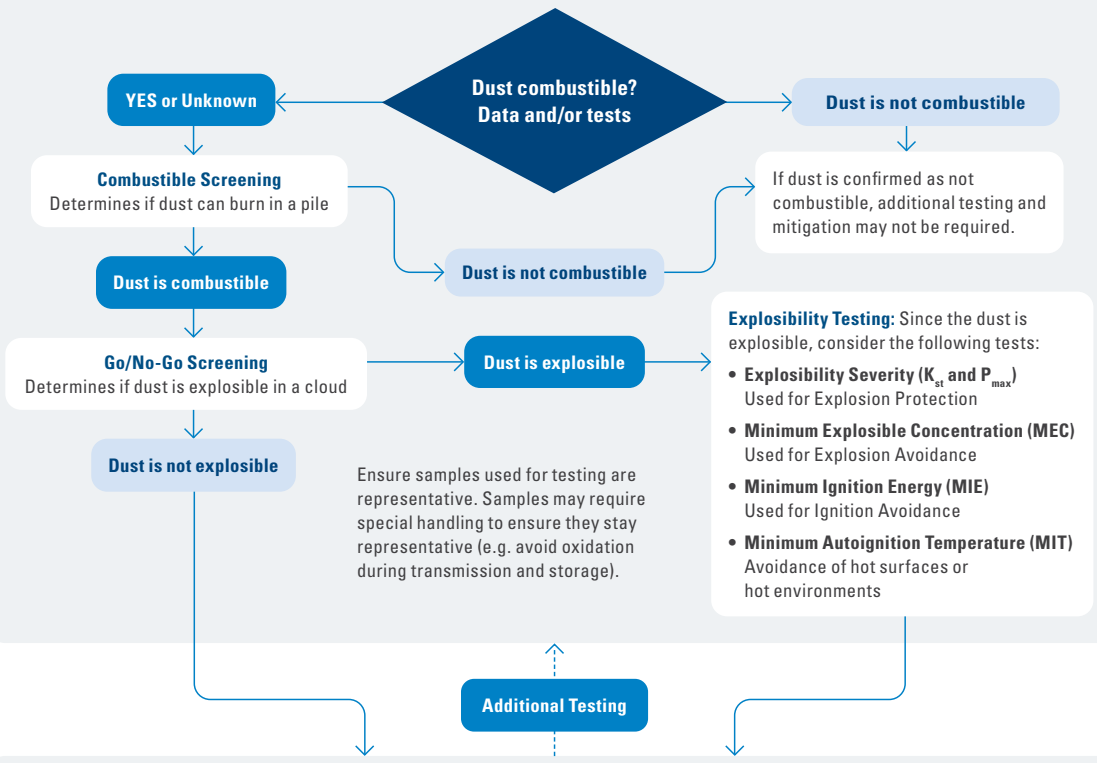
COMBUSTIBLE DUST ROADMAP

This Roadmap is a high-level summary of steps for a process owner to consider if combustible dust may be produced or handled in their facility. The process owner's final selection of dust collectors and risk mitigation strategies should be based on the outcome of a Dust Hazard/Process Hazard Analysis performed by the facility owner. Although early engagement of a dust collector supplier provides helpful insights on the availability and features of various products, facility owners should consult with a combustible dust expert and/or a process safety expert before making actual product and mitigation strategy selections.

Dust Hazard Analysis (DHA)

Completed and Maintained by the Process Owner

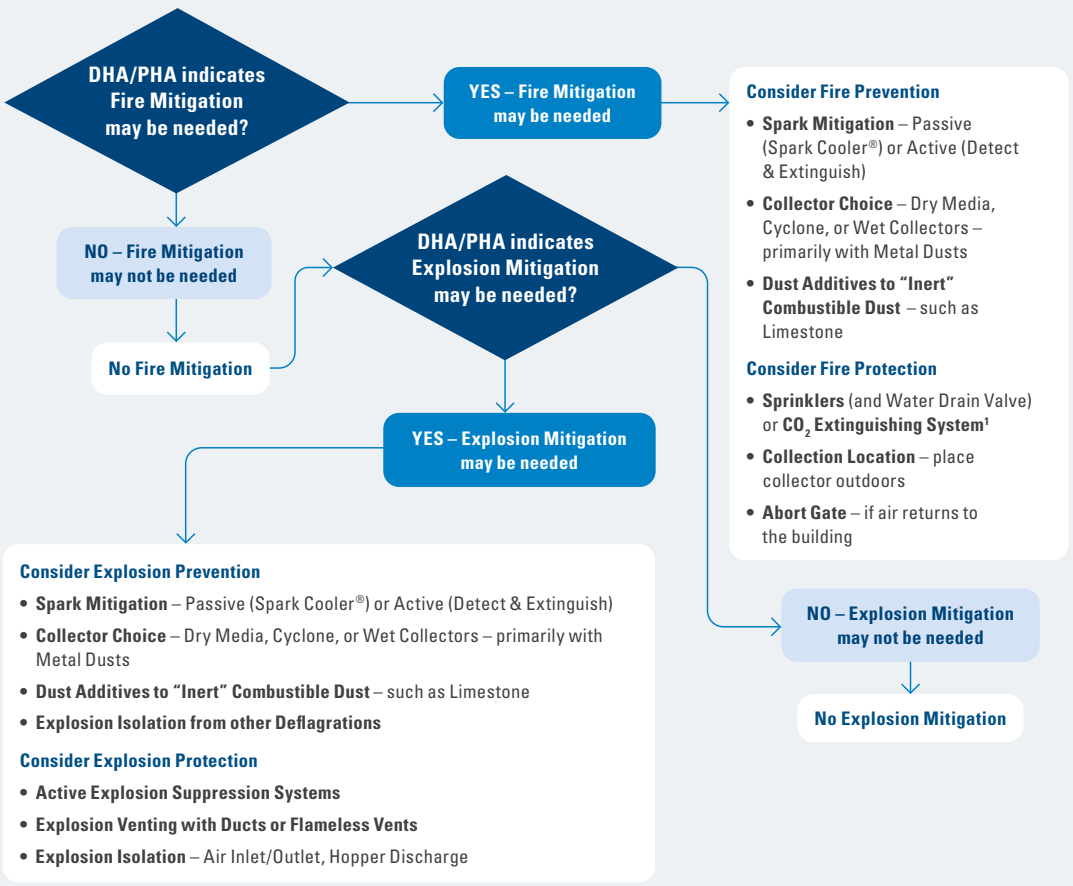
A Dust Hazard Analysis allows a process owner to determine potential combustion risks for dusts produced or handled in their facility.



Dust & Process Hazard Analysis (DHA & PHA)

Completed and Maintained by the Process Owner

A Dust & Process Hazard Analysis allows a process owner to review combustion risks in their processes, and assists the process owner in determining if additional testing and/or mitigation activities are needed to reduce their combustion risks.



Important Information: It is the process owner's responsibility to understand the risks in their process and to mitigate those risks in accordance with all applicable laws, regulations and standards, including consideration of those published by the NFPA. Note this Roadmap may not identify all potential mitigation steps and does not cover the commissioning and on-going testing and maintenance required for various mitigation strategies. This Roadmap is a high-level summary of steps for a process owner to consider and is not intended as a replacement for careful review of all applicable laws, regulations, and standards. Equipment suppliers can assist a process owner in understanding what products are available to help mitigate their risks but they are not regulatory experts. If you need assistance finding an expert in the field, please contact us and we will assist you in finding resource options. Please note that various strategies can help mitigate, but not eliminate risks of fire and explosion.

[1] Water or CO_2 extinguishing strategies may not be suitable for all combustible materials. A recognized expert on fire mitigation can assist in selecting suitable extinguishing strategies (e.g. combustible metals may require Argon systems).

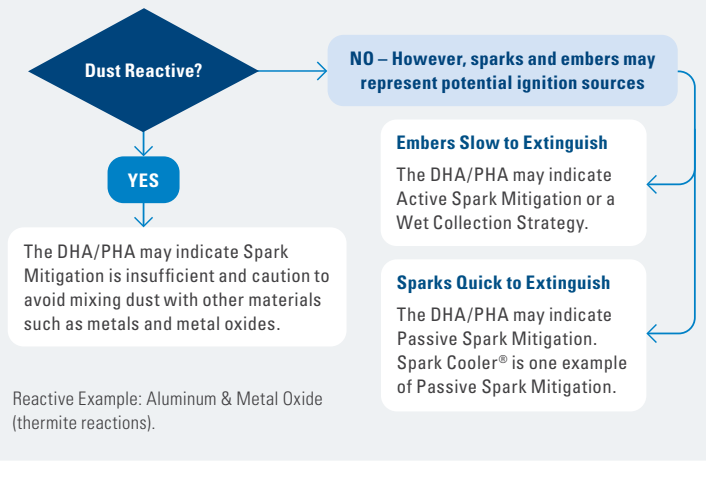
An actual Dust and Process Hazard Analysis should address all the risks identified in a process and will likely define mitigation considerations that are not shown in this simplified example.

Mitigation Strategy Examples

The results below reflect common situations; however, mitigation strategies are influenced by variables not included in this simplified chart. Process owners should use the outcome of their DHA/PHA and discussions with mitigation strategy experts before making actual strategy selections.

Prevention

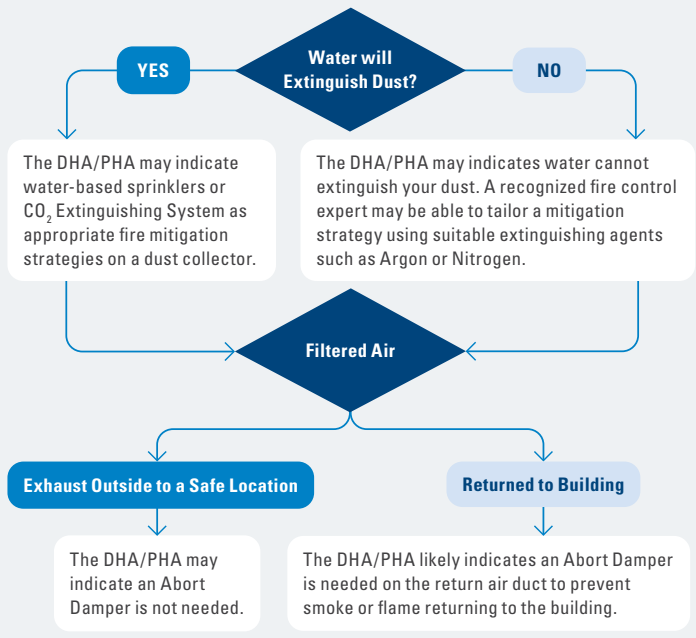
Ignition Source Mitigation Strategy Considerations



Reactive Example: Aluminum & Metal Oxide (thermite reactions).

Fire Protection

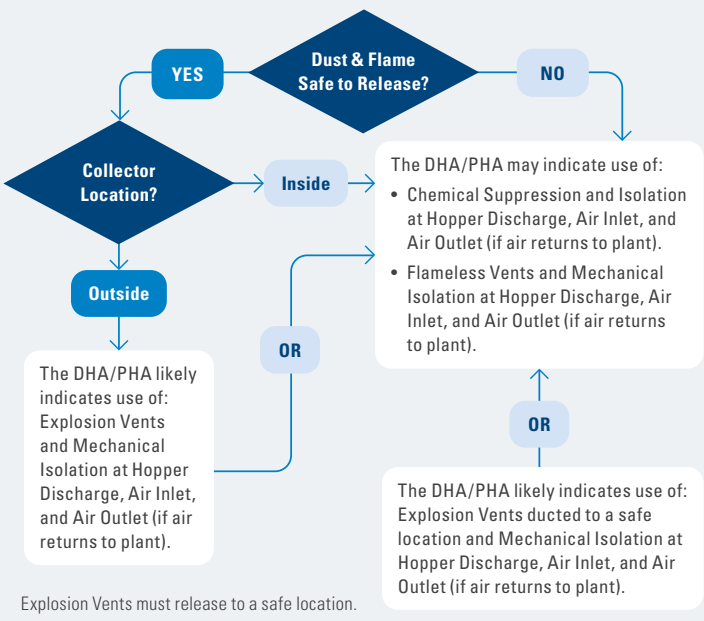
Extinguisher & Return Air Considerations



Location of collector (indoors or outdoors) may influence the complexity of a fire mitigation strategy. Outdoor collector locations are generally preferred by an AHJ.

Explosion Protection

Venting/Suppression & Explosion Isolation Considerations



Explosion Vents must release to a safe location.

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