What type of dust collection system should I consider for handling my hazardous metal dust?

The marketplace is full of dust collection products but unfortunately, there’s no such thing as a one-size-fits-all solution. While the definition of “hazardous” varies among the regulatory bodies, understanding what type of equipment you need comes down to evaluating a few critical factors.

- **Combustion risk:** Each metal dust application can have unique combustion risks. The only way to really know the hazards of your dust is to have it tested. Knowing what specific risks your dust poses helps you understand the regulations surrounding capture, control, and mitigation. Reviewing the standards established by the NFPA is a good first step.

- **Employee exposure:** Determine whether exposure risks exist and what levels are permitted in the workplace. The US Department of Labor publishes a list of acceptable emission guidelines for many different materials including some metals. Careful evaluation of federal and local regulations will help determine what filtration equipment may be appropriate.

- **Environmental impact:** Review the environmental impact of a dust collector. The EPA has hazardous waste regulations applicable to many metal finishing facilities. Even with robust filtration equipment in place, you still need to manage the material coming out of the dust collector.

In addition to these important factors, evaluate how your operational practices and requirements will impact dust collector selection and contribute to your final decision. What are your specific application parameters? What environmental considerations are present? Are there equipment size restrictions? How disruptive will filter changeouts and maintenance be to your operation?

For help answering these questions, it’s best to work with a dust collection technology supplier with the expertise to understand your particular situation and help identify a solution that balances consistent performance efficiency with a reasonable long-term cost of ownership.

John Woolever, market specialist manager, Donaldson, 952-703-4616

Unfortunately there’s no straightforward answer when it comes to this question. There are many variables that you need to consider to arrive at the appropriate solution. Consider the following questions about your material:

- What type of metal dust are you handling?
- What’s the material’s consistency (such as dust, flake, or powder)?
- How much dust do you expect to collect over a given time period?
- Will the dust collector be indoors or can it be outdoors?

Each answer will help to steer you to the appropriate dust collection system. Published standards like NFPA 484 can help with this decision as well. Whichever dust collection method or system type you select, it’s critical that any explosion and fire protection systems specifically address your application’s metal dust hazards to ensure the safety of your operation and employees.

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Metal dust can be both explosive and toxic. An explosive metal dust can be handled by either a dry or wet dust collector. According to the NFPA standards, which must be followed, you can put a wet dust collector either inside or outside the building. If you use a dry dust collector, it must be installed outside.

A wet dust collector doesn’t require as much additional explosion equipment as a dry dust collector. That’s an advantage, but a wet dust collector creates a secondary pollution source in the sludge that develops. If the dust load is too great, the sludge can become a maintenance and disposal problem, negating the cost advantages associated with a wet collector.

With a dry dust collector, there are more rules to follow. The dust must be tested by a lab to determine its explosive characteristics. That dust analysis report will help the system designer properly size the equipment. Any necessary explosion vents and other associated equipment must be properly sized to handle a potential deflagration. Regarding the dust being toxic, you can use HEPA filters as a final system filter. This will allow you to obtain the best collection efficiency even at the submicron range. With respect to either explosivity or toxicity, the most important step is to identify and achieve good housekeeping practices and document that information in a dust hazards analysis (DHA) report as required by the new NFPA 652 standard. Qualified individuals or companies can assist in the creation of these reports.

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Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers’ general expertise and don’t promote the suppliers’ equipment. If you have a question you’d like suppliers to answer, send it to Kayla Carrigan, Associate Editor, Powder and Bulk Engineering, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).