Budgeting Your Dust Collection System

Here's a handy checklist to help you set your budget for a dust collection project.

Dust Collection System Sizing

- ○ Determine the exhaust volume in cfm required:
  - Check the recommended exhaust volumes from equipment suppliers.
  - Refer to Industrial Ventilation: A Manual of Recommended Practice for Design when there are no manufacturer recommendations.

- ○ Determine the conveying velocity requirements:
  - What material will your system be conveying?
  - Refer to Industrial Ventilation: A Manual of Recommended Practice for Design for recommended conveying velocities (specifically table 5-1).
  - The manual can also help you to determine ductwork sizing.
    - » You will need to balance duct size to prevent both drop out and premature wear.
    - » Determine spark arrestor or material drop out requirements.

- ○ Determine the regulatory requirements for your dust collection system:
  - What are the air-to-cloth requirements?
  - What emissions efficiency requirements do you have to meet?
  - What are the stack dispersion requirements?
    - » Stack height based on dispersion modeling.
    - » Stack velocity based on dispersion modeling.
    - » Testing requirements.
  - What explosion mitigation regulations will the system need to comply with:
    - » Determine KST value of dust/waste stream.
    - » Complete a Dust Hazard Analysis (DHA) if you have not had one in the past 5 years.

- ○ Additional sizing considerations:
  - Air-to-cloth ratio, the lower the requirement the larger the collector.
  - Interstitial and can velocities are critical to collector efficiency and operation.
  - The construction materials that will be used on your project are determined by exhaust stream chemistry.
  - Mechanical air separator to remove loading to the collector and may assist with increasing filter life.

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Other Factors to Consider

- Temperature and humidity of the process:
  - The dust collection system should be designed to handle the process temp.
  - Efforts (such as insulating) should be made to ensure dew point isn't reached in the collection system.

- Location of the dust collection system:
  - The location of the dust collection system may determine that a custom collector is required.
  - Will the collector be located indoors or outdoors?

- Filter media selection:
  - The appropriate filters are dependent on several factors, such as emissions efficiency, waste material and temperature.

- Waste discharge system selections:
  - Screw augers vs rotary air locks vs double dump valves.
  - Bulk bag stations vs waste hoppers vs dust mixing systems.

- Stack selections:
  - Stack height based on dispersion modeling.
  - Stack velocity based on dispersion modeling.
  - Testing requirements.

- Fan selection:
  - A properly designed collector can reduce the system's static pressure, reducing the motor size needed for the fan.
  - Direct drive (with VFD) vs belt drive.

- Maintenance requirements:
  - Access decks and/or doors for collector, ductwork and stack.
  - Ladder or staircase access to decks.

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Auxiliary Project Costs

- Concrete and foundations:
  - The concrete and foundation requirements are influenced by maintenance requirements, soil conditions and wind loading.

- Electrical controls/Installation:
  - The system sequence of operations will play a large role in the cost of the controls.
  - The more monitoring your system requires, the higher the costs will be.
  - PLC/HMI operation versus a simple push button to relay the control panel.

- Mechanical installation:
  - Collector placement.
  - Ductwork and hooding.

- Mechanical piping:
  - Pulse jet collectors require a compressed air system.
  - A properly designed system will also need appropriate air dryers, receivers and regulators.

- Start-up, testing and balancing costs:
  - Motor rotations.
  - Fluid Checks.
  - Leak Testing.
  - Pre-coating.
  - Air Readings and adjustments.

- Spare parts and maintenance planning costs