Cyclones

Cyclone separators are an efficient and cost-effective method of removing material from an air stream since they have no moving parts and require little maintenance. Cyclones can be used in a variety of applications from first stage filtration in a multistage cleaning system, product recovery in process lines or filtration in pollution control applications.

TYPES

Cyclones typically fall into two types: High Efficiency and Normal Efficiency cyclones. Both types of are based on similar designs, with various differentiating factors which define the theoretical efficiency of each cyclone as well as proprietary specifications from various manufacturers.

High Efficiency

High Efficiency Cyclones are usually selected when the separating material is fine, with a typical size less than 1/8". These cyclones are also suitable for higher flow rate applications as their higher efficiency design allows for less pressure drop through the cyclone while achieving high separation efficiency. High Efficiency cyclones are also typically made using a sectional construction, which allows for a higher degree of interior finishing and is able to be disassembled to allow for cleaning of any material which may build up on the inside of the cyclone.

Normal Efficiency

Normal Efficiency Cyclones are typically specified for larger material, with sizes greater than 1/8" and are typically rated for lower flow rates than High Efficiency Cyclones. They are typically single piece construction, which leads to lower cost to produce.

Selection

A number of important criteria are taken into account when selecting cyclone for a particular application.

- Material Size and characteristics – defines which type of cyclone would be applicable for the application
- Flow Rate – defines which size of cyclone would be required to be able to provide the necessary throughput.
- Required Line Sizes
  Allowable pressure drop
- Environmental Conditions (Temperature, Humidity, Elevation)

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Using this information, a cyclone is selected which will provide the necessary separating quality, at the desired flow rate using the desired line sizes. Most manufacturers have a standard set of cyclones, from which a model is selected to best suit the application. Some design modifications (within a certain limit) can be made to customize the cyclone such as modifying line sizes (inlet, Air Outlet and Product Outlet).

Other Considerations

There are a number of other considerations to take into account when selecting or designing a cyclone to match a specific application:

Inlet Type

- Standard Tangential Inlet – Product enters on a tangent to the cyclone body and is forced into the vortex be impacting with the interior wall of the cyclone.
- Scroll/Involute Inlet – Product enters on a radial path, gradually accelerating the air stream into the vortex. This potentially reduces the impact of the product with the cyclone wall, thus reducing breakage in fragile materials.

Materials and Applications

- Carbon Steel – Standard/General Applications
- Abrasion Resistant – For Highly abrasive materials such as grain or grit.
- Stainless Steel – For Sanitary applications, or reactive materials.
- Aluminum – For applications requiring a Non-Ferrous material, or where weight is an issue.