towers and wetted filters they all have a constant resistance during their operation.

On the basis of their important characteristics wet collectors may be classified according to Table 2.

FILTERS

Filters for industrial air and gas cleaning consist primarily of cloth dust collectors and the ultra or absolute type of filter.

Cloth dust collectors are generally constructed in the form of housings with cloth envelopes drawn over wire screen frames or with vertical cloth

TABLE 1. INERTIAL SEPARATOR CHARACTERISTICS

	Efficiency Particle Size Range In Microns			Resistance (Pressure Drop)	Description and Remarks
	>100	100–10	<10		
Settling and baffle chambers	Medium	Low	Low	Low	A large chamber to reduce velocity to permit settling. Auxiliary baffles are sometimes used to improve performance Requires large space
Large diameter cyclones	High	Medium to Low	Low	Low	Considered as single body over 3 ft in diameter Gases and material must be dry. Air-tight dust bins or continuous removal of material must be provided. Space requirements moderate
Refined design centrifugals	High	High	Medium to low	Medium	Available as multiple small diameter tubes, scroll shaped bodies, and multiple louvers Gases and material must be dry. Air-tight dust bins or continuous removal of material must be provided. Space requirements moderate
Integral rotor type	High	High	Medium to low	See remarks	Rotor acts as air mover and separating element Usually limited to dry granular materials and dry gases. Low space requirements No external pressure loss involved but power requirements are higher than usual exhauster
Slotted scroll fan	High	Medium to low	Low	See remarks	Separation takes place in fan scroll No external loss involved but power requirements are higher than usual exhauster

bags or tubes. Cloth filters depend to a great extent on the accumulated dust layer for their effectiveness. Their basic or initial efficiency depends upon the type of fabric employed; felted media such as wool gives higher initial removal than woven fabrics. The increase in resistance to air flow, resulting from the accumulated dust layer, is related to rate of flow, concentration, and characteristics of the contaminant. Removal of the collected material is accomplished through periodic shaking by single mechanisms or combinations of them employing rapping, or through reversal of air flow, or by means of high velocity reverse air jets. With shaking or rapping, air flow is not constant and filtering velocities are usually held under 6 fpm. With reverse jets or reverse air flow, substantially constant air flow is maintained and filtering velocities are generally higher (up to 35 fpm). Filtering velocities in all fabric collectors are highly dependent upon the aerosol, fume, or dust being collected.

The ultra or absolute type of filter[8] may consist of pleated cellulose as-

TABLE 2. CHARACTERISTICS OF WET COLLECTORS

	Efficiency Particle Size Range In Microns			Resistance In. Water	Water Rate In Gallons Per 1000 Cu Ft Gas	Maintenance	Description and Remarks
	>10	10–1	<1				
Air washers	High	Medium	Low	Low (less than 1)	5–15	Medium	Composed of one or more banks of low pressure sprays and flooded eliminator plates. Space requirements are large. Water is usually recirculated
Wet filters	High	High	Medium	Low (less than 1)	3–8	Medium	Composed of one or more banks of low pressure sprays flooding packed cells of glass or other fibers. Space requirements are large. Limited to low loadings of solid particles
Packed towers	High	High	Medium	High	5–10	High	Composed of granular or ceramic packing. Space requirements large. Generally limited to gas absorption
Spray towers	High	Medium	Low	Low	5–10	Low	Usually a vertical chamber equipped with low pressure water sprays at the top or along the walls. Baffle plates may be provided for contacting. Space requirements medium. Usually applied for hot gases
Centrifugal or inertial scrubbers	High	High	Medium to high	Medium (see remarks)	½–40	See remarks	This classification includes most of the commercial wet collectors. They may utilize singly or in combination, low or high pressure sprays, wetted plates, rotating members, liquid gas contact by induction or centrifugal action Some of these units (disintegrators) have high overall power requirements for driving the rotor while others have high power consumption for raising water pressures for spray nozzles Maintenance varies from low to high depending on component parts. Simple gas liquid contact units would be classified as low. Units having rotating members may vary from medium to high depending on the type of service
Venturi scrubber	High	High	High	High (12–25)	5–10	Medium	Consists of a simple venturi with low pressure sprays at throat followed by cyclonic type separator. Space requirements are low. Unit functions independent of grain loadings High velocity at venturi throat may cause erosion problems