TABLE 2

Classes of Particulate Filters

Classes of Filters	Initial ΔP @ Rated Capacity (In Inches)	Typical Size (In Inches)	Typical Rated Flow (In CFM)	NBS Atmospheric Stain Efficiency (In Per Cent)	AFI Artificial Weight (In Per Cent)	Approximate Element Cost
Viscose (oiled) Fibrous, Impingement (Common Furnace Filter)	.08-.12 WG	24 x 24 x 2	2500	5-12	65-75	.25-2.00
Viscose (oiled) Metallic, Impingement	.08-.12 WG	24 x 24 x 2	2500	5-12	65-75	$8-$12
**Dry, Fibrous Low-Medium Efficiency	.20-.4 WG	24 x 24 x 29 24 x 24 x 11 ½	2000	50-55	100*	$25-$35
**Dry, Fibrous Medium Efficiency	.20-.50 WG	24 x 24 x 29 24 x 24 x 11 ½	2000	80-85	100*	$25-$40
**Dry, Fibrous High Efficiency	.35-.60 WG	24 x 24 x 29 24 x 24 x 11 ½	2000	90-95	100*	$25-$45
Dry, Fibrous Hospital Type	.30-.50 WG	24 x 24 x 11 ½	1000	100*	100*	$50-$90
Dry, Fibrous, High Interception High Efficiency Particulate Air Filter	.70-1.2 WG	24 x 24 x 11 ½	1000	100*	100*	$60-$100

*Essentially 100 per cent—Evaluation method not sufficiently critical to detect penetration.

**NOTE: To identify these classes better, the efficiencies reported are comparable to those for commercial electrostatic precipitators on the atmospheric air NBS dust spot test.

It should be noted that manufacturers report filter efficiencies various ways. Hence, a full understanding of type of filter and the filter efficiency is necessary to obtain a satisfactory system.

Shortcomings of a fibrous particulate filter are:

1) It adds resistance to the existing ventilation system;

2) It must be replaced about once a year;

3) It requires relatively large space.

Electrostatic preciptators use a high intensity electrical field to charge particles, which are collected on an opposite charged surface. The units vary in size from less than 100 cfm to thousands of cfm. A good average cost of a 500 cfm unit would be approximately $500. The collecting efficiency would be equal to the previously mentioned dry fibrous medium-type filters. The units offer excellent efficiency at low pressure drops. However, in general, the initial cost is high, frequent maintenance is required, and it is not uncommon to generate ozone and oxides of nitrogen.

Mechanical separators range from simple settling chambers, which employ gravitational forces, to sophisticated devices such as centrifugal separators. Usually dry-type mechanical devices have poor removal efficiencies on particles less than 10 microns in size. Excellent efficiences are obtained by combining mechanical separators with a wet method, such as a venturi-type scrubber. Due to the numerous combinations of mechanical separators, their cost varies depending upon the application. Usually, they require less maintenance than other type separators. The most likely use for a dry-type separator is pre-filtration for high efficiency filters.

In situations where it is not feasible to create and maintain engineering controls, proper respiratory protective devices must be provided and used. Because there are many types of such devices, it is important that they be selected with utmost care to ensure that proper protection is afforded.—End.

REFERENCES

ASHRAE Guide and Data Book, Systems 1970. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 345 47th St., New York 10017.

Industrial Ventilation, 11th edition. American Conference of Governmental Industrial Hygienists. Committee on Industrial Ventilation, Box 453, Lansing, MI 48902.

Air Pollution Control Manual. Part II—Control Equipment. 1968. American Industrial Hygiene Association, 210 Haddon Ave., Westmont, NJ 08108.

Industrial Health Engineering, Brandt, Allen D. 1947. John Wiley and Sons, Inc., 605 Third Ave., New York 10016.

Fundamentals of Industrial Hygiene, edited by Olishifski, J. B. and McElroy, F. E. 1971. National Safety Council, 425 N. Michigan Ave., Chicago 60611.