

entering surface of a filter may clog very rapidly. For such a condition, a dry type of filter is usually preferable.

A chart showing the increase in resistance of a unit filter of the viscous impingement type, when tested with the standard test dust described in the Code, is given in Fig. 1. The resistance to air flow of three typical clean viscous impingement type filters having different densities of mediums is shown in Fig. 2. Type A is a dense pack used in bacterium control; Type B is a medium pack used for general ventilation work,

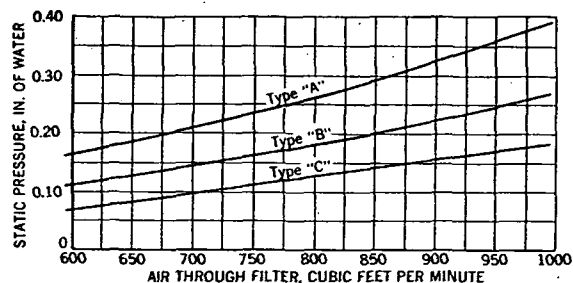


FIG. 2. RESISTANCE TO AIR FLOW OF TYPICAL UNIT AIR FILTERS

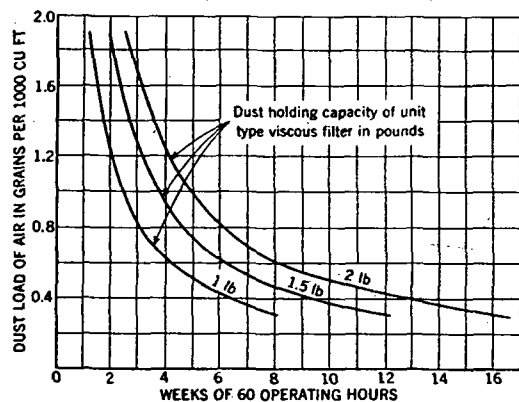


FIG. 3. MAINTENANCE CHART FOR UNIT TYPE VISCOUS FILTERS

and Type C is a low resistance unit for use where low resistance is the important factor and maximum cleaning efficiencies are not essential. The operating characteristics which might be expected under various dust concentrations with air filters having different dust-holding capacities are illustrated in Fig. 3.

Filters consisting of inexpensive frames of cardboard or similar material filled with viscous-coated glass wool, steel wool or the like are available. Because of their construction these units may be discarded when dirty and replaced with new units at relatively little expense. They are used in general ventilation work and with warm-air furnaces and other instal-

lations where low first cost and low resistance to air flow are essential. The operating characteristics of these units conform in general with those of the rigid frame type.

Viscous Automatic Filters

In this type of filter, the removal of the accumulated dust is done automatically instead of by hand. The automatic cleaning and recoating of these filters is based on the principle that the viscous fluid itself will perform the cleaning function, thereby eliminating a separate washing agent. The dust collected by the filter is deposited finally in the bottom of the viscous fluid reservoir from which it may be removed by different methods, depending on the design of the filter.

The filtering medium of the automatic filter is assembled in the form of an endless curtain suspended vertically, with its lower portion submerged in a viscous fluid reservoir. Cleaning and recoating is accomplished by slowly moving the curtain through the bath. The curtain is driven by an electric motor, and its motion may be continuous or intermittent.

The customary resistance to air flow is $\frac{3}{8}$ -in. water gage at an air velocity of 500 fpm, measured at the filter entrance. Automatic viscous filters are made up in units which are delivered either fully assembled or in parts to be assembled at the point of installation.

DRY AIR FILTERS

Dry air filters, in which dust is impinged upon or trapped in screens made of felt, cloth, cellulose, or other fabrics, are available in various types. These filters require no adhesive liquid, but depend on the straining or screening action of the filtering medium. Because of the close texture of the materials used in most of the dry filters, the surface velocity, or velocity of the entering air, ranges between 10 and 50 fpm, depending on the nature and texture of the fabric. This necessitates a relatively large screen surface, which is usually arranged in the form of pockets to bring the frontal area within customary space requirements.

As with viscous unit filters, an average constant resistance and air volume may be obtained by periodic reconditioning or renewal of the filter screens. Since some materials suitable for dry filtering mediums are affected considerably by moisture which tends to cause a rapid increase in resistance, they should be treated or processed to minimize the effect of changes in humidity.

Filters using felt and similar materials usually depend upon vacuum cleaning for reconditioning. A special nozzle, operated from a portable or stationary vacuum cleaner, is shaped to reach all parts of the filter pockets. Permanent filter mediums should be capable of withstanding repeated vacuum cleanings without loss in dust removal efficiency. While most dry filters are cleaned by replacing an inexpensive filter sheet, the useful life of these sheets often may be lengthened by vibrating or vacuum cleaning.

AIR WASHERS

Air washers, originally designed as the name implies to wash air, are now used for humidification (see Chapter 27). Their ability to cleanse