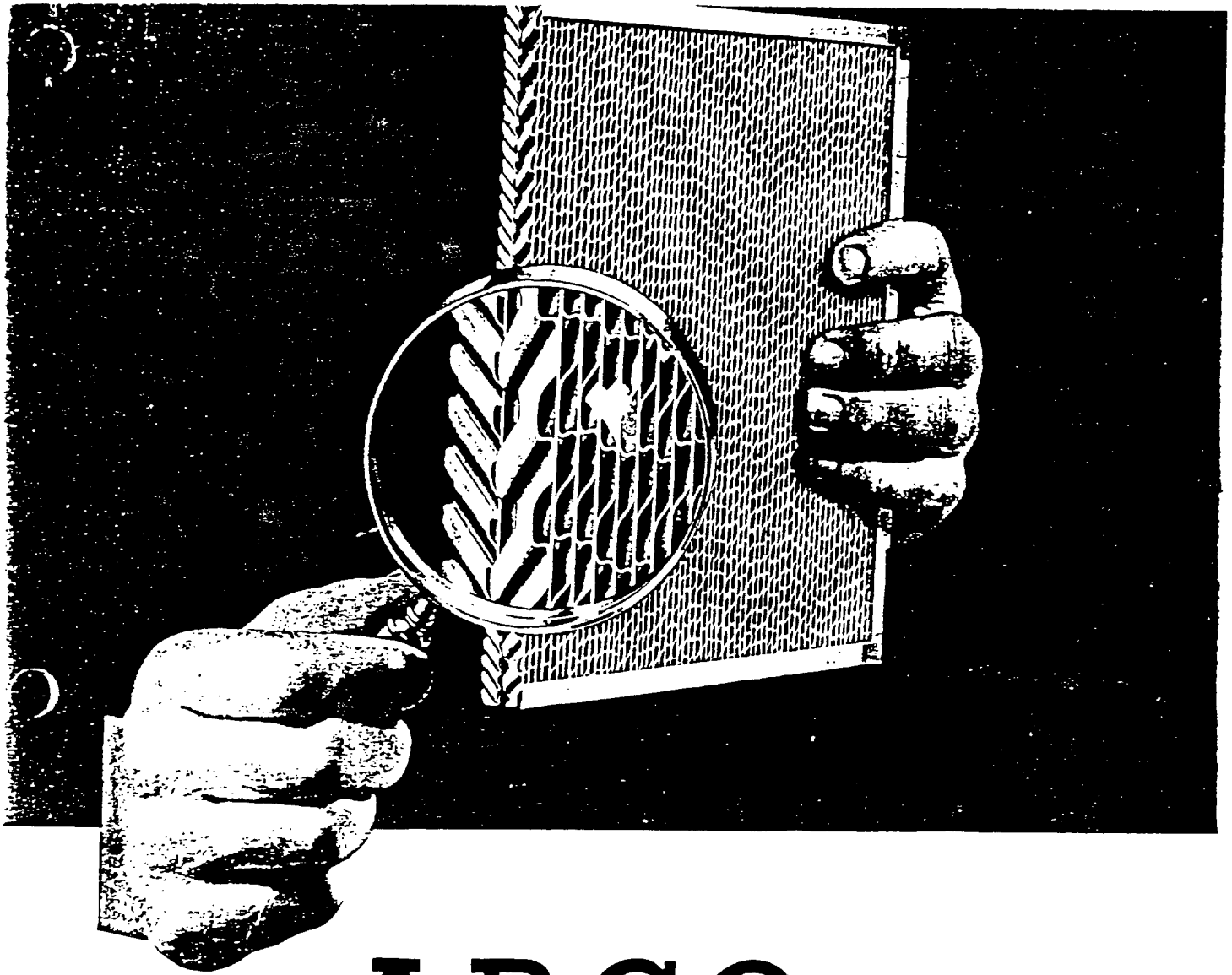




ARCO AIR FILTERS

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PLAINTIFF'S
EXHIBIT

ASI-513

13514

ARCO AIR FILTERS

CONSTRUCTION

The ARCO Air Filter is a replacement type of filter constructed of corrugated fibre board, so arranged as to form cellular passages. Each filter is composed of two wafers. In the No. 1 Filter the cellular passages in both wafers are the same size. In the No. 2 and No. 25 the cellular passages in the wafer on the inlet side are larger than the passages in the wafer on the outlet side. The cellular passages in the wafers are "V" shaped on a 90° angle. The two wafers are separated by a $\frac{1}{8}$ " strip, and are bound in a heavy fibre frame to make a complete unit.

OPERATION

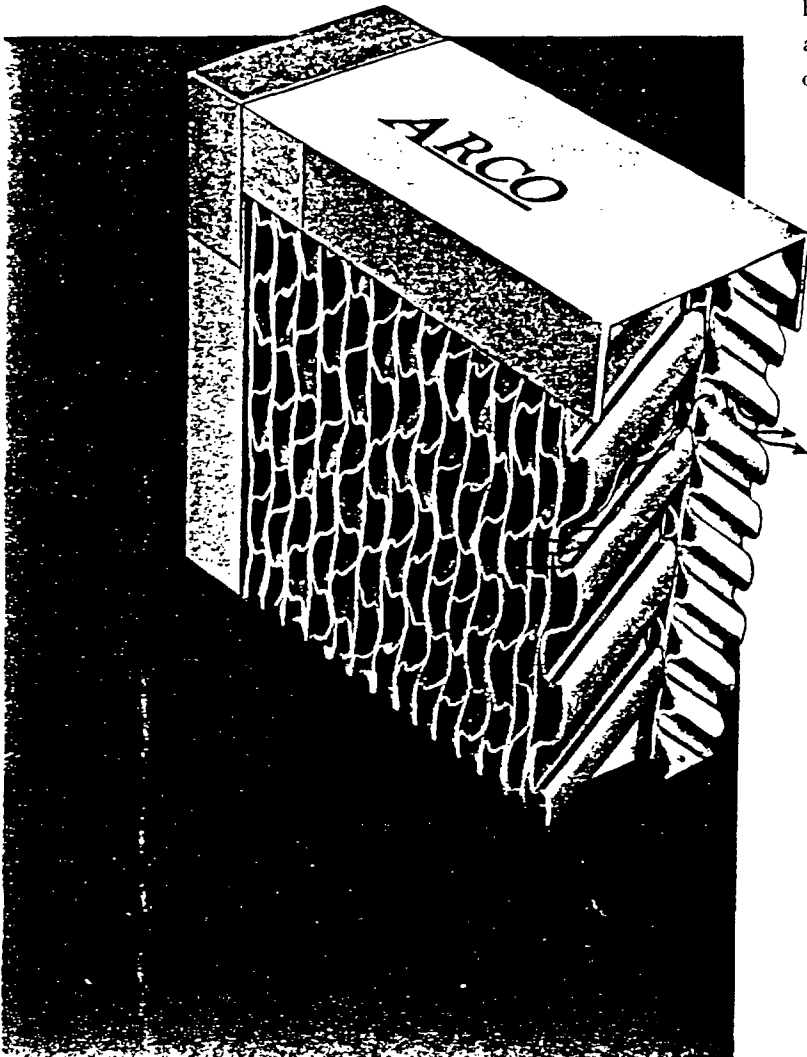
The dust laden air entering the filter immediately changes direction on a 45° angle, thus causing a scrubbing along the sides of the cellular passages in the first wafer. After leaving the cellular passages in the first wafer, the air abruptly changes direction on a 90° angle, scrubbing along the sides of the passages in the second wafer.

As dust impinges on the sides of the cellular passages, oil is absorbed by capillary attraction into each dust particle, and that dust particle then becomes the medium for catching other dust particles. These, in turn, absorb oil and become the new medium for dust arrestance, and this process continues until the filter becomes completely dust laden.

COATING

The coating is a special compound which is odorless, remains tacky at minus 10° F. and will not drip at 180° F. It does not contain any substance that will become rancid.

The special compound is sprayed on all wafers, before they are assembled into one unit, at a temperature that insures thorough penetration of the fibre board.



BASIS FOR SELECTION OF A REPLACEMENT TYPE AIR FILTER

THE function of an air filter is to clean the air. So it might seem that the most efficient air filter would be the one to select. But there are other elements than efficiency that enter into the selection of an air filter.

Types of Filters

The most efficient filters may be most efficient only when clean, and the efficiency may drop, as the filter becomes dust laden, to a point where dirt actually passes through. See Chart No. 1 on page 4. On the other hand, a filter may have a high efficiency when clean but may deposit the dirt only on its surface and in a very short time build up such a resistance that the air flow is materially obstructed. See Chart No. 2. Or efficiency may be obtained at a very great expense in power consumption, due to the high resistance set up by the filter. See Chart No. 3.

Still another type of filter may be built at a cost out of all proportion to the benefits obtained, and owe its high efficiency to its heavy, cumbersome construction.

Factors to Consider

The filter that embodies the following five factors is the one to select.

1. Low maintenance cost.
2. Effective efficiency throughout the life of the filter, until fully dust-laden.
3. Low resistance to the air in relation to effective efficiencies.
4. Large dust-carrying capacity.
5. Uniform efficiencies and resistances of any one filter and among all filters of the same type.

In addition, these factors must be considered in the selection of a replacement type filter:

that the filter shall be odorless and remain odorless; that its viscous coating shall not harden under low temperature or run off at high temperature. All of these are fundamental requirements of any effective filter and are embodied in the design of the ARCO Air Filter.

Uniform Efficiency of ARCO Air Filters

From the charts on pages 6 and 7, the efficiencies of ARCO Air Filters are demonstrated. It will be noted that the efficiencies do not decrease, but rather increase as the filters become dust-laden. This action is due to the fact that ARCO Air Filters carry a considerable quantity of viscous, tacky oil that is continuously absorbed through capillary attraction by the dust as it impinges on the walls of the filter passages. The oil-laden dust, adhering to the tacky surface, becomes the media for arresting other particles of dust as they come into the filter.

The ability of the fibre board material, of which ARCO Air Filters are made, to absorb and hold considerable viscous oil and to give up this oil to dry dust as needed accounts for the uniformly high efficiency of ARCO Air Filters throughout their life, until the filter becomes fully dust-laden.

The charts also show that the resistance in ARCO Air Filters is low when the filters are clean and builds up very slowly and uniformly as the filter becomes dust-laden. This low resistance results in low power consumption and insures the full volume of air passing through the filter under all operating conditions.

This method of arresting the dust in the filter, by absorbing viscous oil, accounts for the

exceptionally large dust-carrying capacity of ARCO Air Filters. The dust firmly adheres to the sides of the angular passages and builds up evenly until eventually the filter is completely filled. The space between the two wafers, or two halves of the filter, provides additional dust-carrying capacity.

Uniform In Construction

Uniformity in efficiency and uniformity in resistance are outstanding features of ARCO Air Filters. The AREA, DEPTH and ANGLE of every cellular passage in each wafer or side of an ARCO Air Filter are exactly alike — and exactly alike in all ARCO Air Filters of the same type. Therefore, engineering calculations of volume of air, velocity of air, size and speed of the fan, and power consumption may be applied to all ARCO Air Filters of the same type. There are no variations, so commonly found in

many other types of filters. ARCO Air Filters are dependable in their performance alike to the manufacturer, the installer, and the user of apparatus involving air cleaning.

Pollen Removal

Hay fever, with its yearly toll of several million dollars in economic loss, as well as the enormous amount of suffering it causes, has been traced partly to the pollen and dust which fill the air. When the air breathed by the hay fever patient is cleansed of pollens, great relief is experienced.

The pollen removal characteristics of the ARCO Air Filter render its use extremely effective in the treatment of hay fever. Tests indicate efficiencies of 99% when these filters are used in tandem, and well over 95% for single filters.

Charts on actual tests, illustrating common faults in some competitive filters
Numerals at bottom are based on equal time intervals.

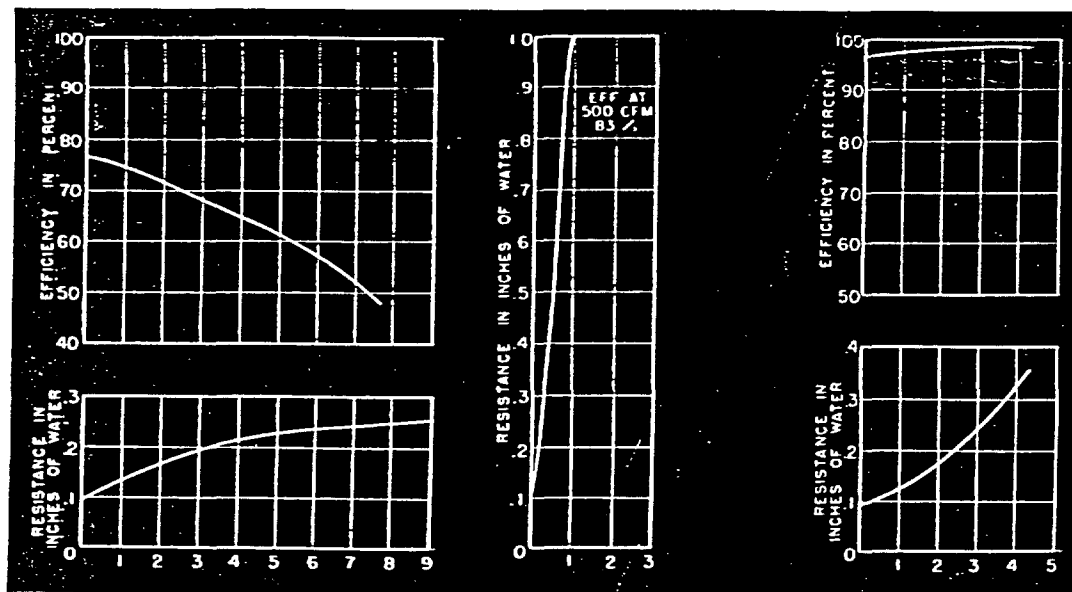


Chart No. 1

Illustrative of a filter which falls off in efficiency as it becomes loaded. In this case filter will pass dust after a very short period of operation.

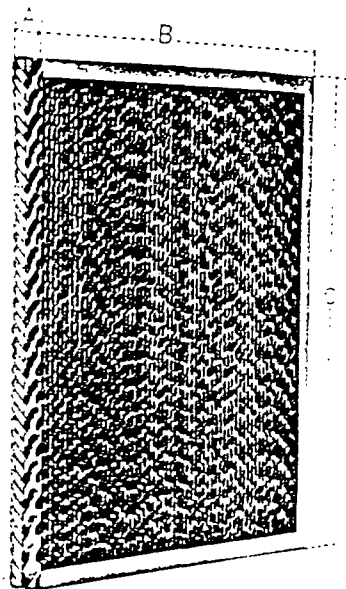
Chart No. 2

Illustrative of a filter having a relatively high efficiency but extremely low dust capacity. In a short time scarcely any air will pass through.

Chart No. 3

The rapidly increasing resistance of the filter illustrated here indicates that a high power consumption would be required in operation.

ACTUAL DIMENSIONS OF STANDARD SIZES



Arco Air Filter

STANDARD SIZES

16" x 20" x 2"
16" x 25" x 2"
20" x 20" x 2"

		Actual Dimensions		
Type	Nominal Sizes	A	B	C
No. 1	16" x 20" x 2"	17 $\frac{1}{8}$ "	15 $\frac{7}{8}$ "	19 $\frac{1}{8}$ "
No. 1	16" x 25" x 2"	17 $\frac{1}{8}$ "	15 $\frac{7}{8}$ "	24 $\frac{1}{8}$ "
No. 1	20" x 20" x 2"	17 $\frac{1}{8}$ "	19 $\frac{23}{32}$ "	19 $\frac{23}{32}$ "
Type	Size	A	B	C
No. 2	16" x 20" x 2"	17 $\frac{1}{8}$ "	15 $\frac{7}{8}$ "	19 $\frac{1}{8}$ "
No. 2	16" x 25" x 2"	17 $\frac{1}{8}$ "	15 $\frac{7}{8}$ "	24 $\frac{1}{8}$ "
No. 2	20" x 20" x 2"	17 $\frac{1}{8}$ "	19 $\frac{23}{32}$ "	19 $\frac{23}{32}$ "
No. 2	20" x 25" x 2"	17 $\frac{1}{8}$ "	19 $\frac{11}{16}$ "	24 $\frac{1}{16}$ "
Type	Size	A	B	C
No. 25	16" x 20" x 2"	17 $\frac{1}{8}$ "	15 $\frac{7}{8}$ "	19 $\frac{1}{8}$ "
No. 25	16" x 25" x 2"	17 $\frac{1}{8}$ "	15 $\frac{7}{8}$ "	24 $\frac{1}{8}$ "
No. 25	20" x 20" x 2"	17 $\frac{1}{8}$ "	19 $\frac{23}{32}$ "	19 $\frac{23}{32}$ "
No. 25	20" x 25" x 2"	17 $\frac{1}{8}$ "	19 $\frac{11}{16}$ "	24 $\frac{1}{16}$ "

Note: Above nominal sizes allow sufficient clearance for easy replacement.

REGULAR STOCK SIZES

15" x 20" x 2"
10" x 20" x 2"
10" x 10" x 2"

		Actual Dimensions		
Type	Nominal Sizes	A	B	C
No. 2	15" x 20" x 2"	17 $\frac{1}{8}$ "	14 $\frac{13}{16}$ "	19 $\frac{13}{16}$ "
No. 2	10" x 20" x 2"	17 $\frac{1}{8}$ "	9 $\frac{7}{8}$ "	19 $\frac{7}{8}$ "
No. 2	10" x 10" x 2"	17 $\frac{1}{8}$ "	9 $\frac{13}{16}$ "	9 $\frac{13}{16}$ "
Type	Size	A	B	C
No. 25	15" x 20" x 2"	17 $\frac{1}{8}$ "	14 $\frac{13}{16}$ "	19 $\frac{13}{16}$ "
No. 25	10" x 20" x 2"	17 $\frac{1}{8}$ "	9 $\frac{7}{8}$ "	19 $\frac{7}{8}$ "
No. 25	10" x 10" x 2"	17 $\frac{1}{8}$ "	9 $\frac{13}{16}$ "	9 $\frac{13}{16}$ "

Special sizes and thicknesses other than the above can be furnished on application.

TYPES OF ARCO AIR FILTERS

- No. 1 — Inlet wafer $\frac{3}{16}$ " corrugated; outlet wafer $\frac{3}{16}$ " corrugated. For high efficiency industrial applications such as air compressors and internal combustion engines.
- No. 2 — Inlet wafer $\frac{3}{16}$ " corrugated; outlet wafer $\frac{3}{16}$ " corrugated. For ventilating systems, or for furnace and air conditioning installations where a portion of air handled is outside air. Usually installed in tandem in ventilating systems.
- No. 25 — Inlet wafer $\frac{1}{2}$ " corrugated; outlet wafer $\frac{3}{16}$ " corrugated. For installations where major part of air handled is recirculated air.

SIZES AND THICKNESS OF ARCO AIR FILTERS

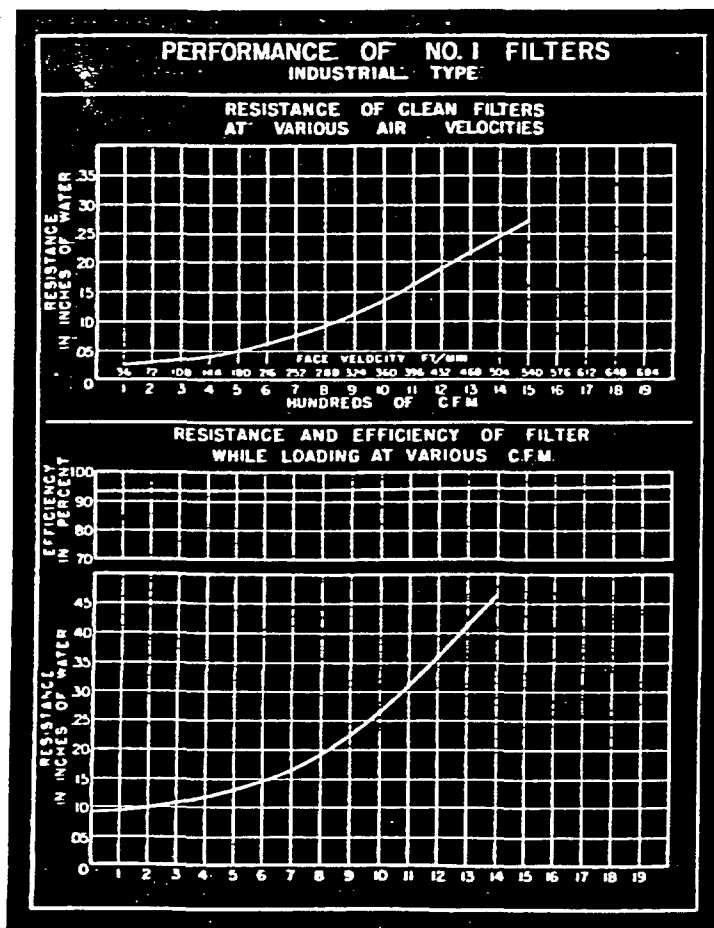
ARCO Air Filters are furnished in standard and regular stock sizes, shown on page 5.

However, they can be made in any size and in any thickness to meet your requirements.

Several concerns are using a single-pass ARCO Air Filter 1" thick, made of $\frac{3}{16}$ " corrugated fibre board, which shows an initial resistance of .02 W.C., with a relatively high cleaning efficiency. This is an illustration of our ability to furnish filters to meet all needs.

PERFORMANCE DATA FOR ARCO AIR FILTERS

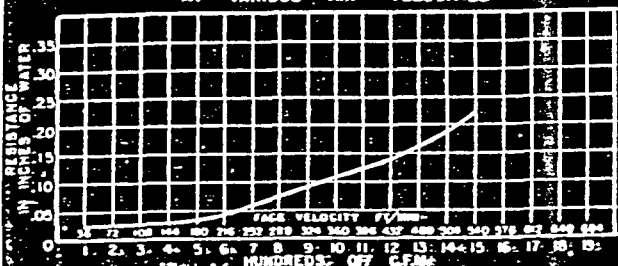
The following data is based on tests made using dust of a concentration of one ounce to 50,000 cu. ft. of air. The dust used is a mixture of 50% lamp black and 50% coal ash by weight, passed through a 100 mesh screen. The dust is thoroughly dried before being tested.



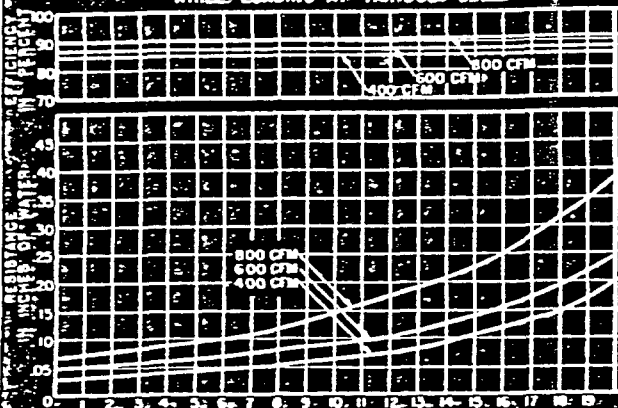
It should be borne in mind that dust concentration of one ounce to 50,000 cu. ft. of air, which is the quantity used in these tests, is abnormally high and, hence, the continuous time intervals indicated by numerals at bottom of charts may each represent several days or even weeks, depending upon the actual amount of dust in the air where the filters are installed.

PERFORMANCE OF NO.2 FILTERS AIR CONDITIONING - MEDIUM RESISTANCE TYPE

RESISTANCE OF CLEAN FILTERS AT VARIOUS AIR VELOCITIES



RESISTANCE AND EFFICIENCY OF FILTER WHILE LOADING AT VARIOUS CFM



PERFORMANCE OF NO.25 FILTERS FURNACE OR LOW RESISTANCE TYPE

RESISTANCE OF CLEAN FILTERS AT VARIOUS AIR VELOCITIES

