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ATTENTION: MR. RAY STAHL  
SUBJECT: NEW LIBRARY BUILDING

GENTLEMEN:

IT IS MY UNDERSTANDING THAT THIS BUILDING WILL BE COMPLETELY AIR CONDITIONED. ONE OF THE MOST IMPORTANT FUNCTIONS OF AIR CONDITIONING IS CLEANING. TOO MANY TIMES WE KID OURSELVES ABOUT CLEAN AIR. I KNOW YOU REALIZE THE IMPORTANCE OF CLEAN AIR IN A LIBRARY. IT COSTS MONEY TO KEEP BOOKS CLEAN. THERE WILL ALSO BE A TREMENDOUS SAVING IN MAINTENANCE, PAINT, ETC.

I HOPE YOU WILL CONCUR WITH ME AND BRING TO THE ATTENTION OF YOUR ARCHITECTS THE LITERATURE I AM SUBMITTING IN DUPLICATE FOR THAT PURPOSE.

THE AEROSOLVE FILTER I AM RECOMMENDING HAS BEEN USED IN THE NEW ELIZABETHTON HOSPITAL, THE NEW KINGSPORT HOSPITAL, THE SPERRY-FARRAGUT PLANT AT BRISTOL, AND A NEW PERSONNEL BUILDING JUST COMPLETED AT TENNESSEE EASTMAN.

THE FILTERS AT THE SPERRY PLANT HAVE BEEN IN USE FOR NEARLY TWO YEARS WITH NO REPLACEMENT OF CARTRIDGES. ON THIS BASIS, THE TOTAL MAINTENANCE COST WOULD BE NO MORE THAN \$8.00 ANNUALLY PER 1,000 CFM. THERE IS NO FILTER ANY MORE ECONOMICAL THAN THIS, AND THE EFFICIENCY IS EQUAL TO ELECTROSTATICS.

YOURS VERY TRULY,  
LANCASTER ASSOCIATES

EAL, JR./GMW  
APRIL 20  
1959

E. A. LANCASTER, JR.

ENCLOSURES



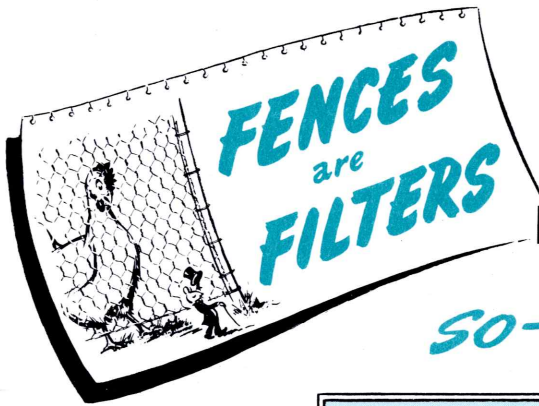
# High-Efficiency Air Filtration

## WHAT IS CLEAN AIR?

Clean air is largely a matter of degree. Air which is satisfactory for one application might be much too dirty for another. Particles generally visible to the human eye, 10 micron (.0004") diameter, constitute only a small part of the total dirt load.

These visible particles are effectively removed by almost any type of filter, but the resultant "filtered" air is still heavily loaded with smudge-producing, damage-creating aerosols of many kinds.

The term "high-efficiency" has been given to air-cleaning devices which remove a high percentage of these invisible particles from the air. (See N.B.S. test figures in chart below)



This One is **100%** Efficient on Chickens — but **0%** on Mice!

**SO—** when you compare filter efficiencies, use the same test

STANDARD TESTS — PERCENTAGE OF EFFICIENCY			
TYPE FILTER	ASHVE (Weight Test)	NBS TEST # (Atmospheric Dust)	DOP TEST (0.3 Micron Smoke)
Cambridge ABSOLUTE®	*	*	** 99.97 Min.
Cambridge AEROSOLVE® 95	*	90-95	80-85
Cambridge AEROSOLVE 85	99	80-85	50-60
Cambridge AEROSOLVE 35	96	30-35	20-30
Electronic Precipitator	99	85-90	60-70
2" Cleanable	76	8-12	2-5
2" Throwaway	76	8-12	2-5

\*Practically 100%. Test not practical for more accurate reading.  
 #National Bureau of Standards Discoloration Test.  
 \*\*Maximum Allowable Penetration of Dioctyl Phthalate Smoke 0.03%. Every filter individually tested.

$$80\% = \frac{90\%}{2}$$

Your old math prof would give you a flat zero for this equation, but it illustrates an important point in air filtration.

The dirt which passes through the filter is what does the damage. Dirt *penetration* is the critical factor. If a filter is 90% efficient on a certain type of dirt, it will allow 10% of that dirt to pass through. The penetration through an 80% filter is 20% — twice as much.

In relative cleanliness of downstream air, an 80% filter is therefore only half as efficient as a 90% filter. Even a 99% filter is only 1/33rd as efficient as a 99.97% filter.

**Remember, it is the dirt which gets through that causes the damage!**

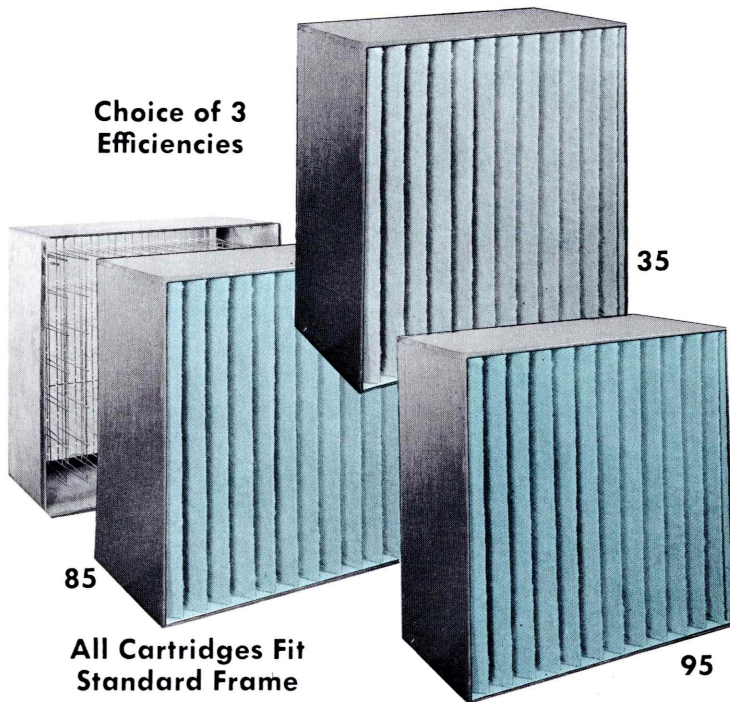


# How to Select the Right Filters

Filter selection is seldom a matter of exact specification, since the degree of efficiency needed is usually not known. And even where the proper filters have been installed, future changes in the process or in the condition of the supply air may require a change in filter efficiency.

Cambridge Filter Corporation, which has specialized in the entire range of high efficiency filtration, has a wide experience in all types of applications. Let Cambridge help you make the best choice.

## FILTER FLEXIBILITY

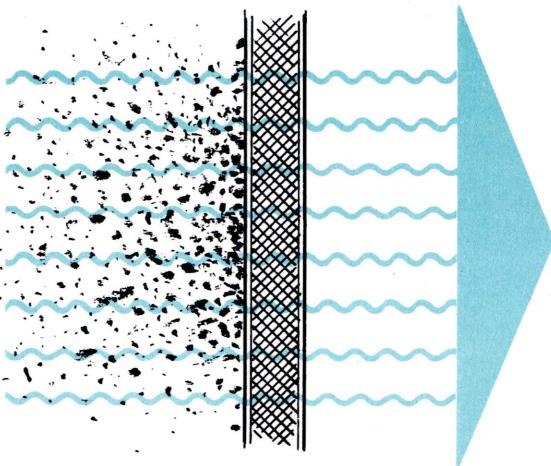


With Cambridge AEROSOLVE® Filters, it is a simple matter to convert to filters of higher or lower efficiency as required. This is done simply by substituting cartridges, all of which are interchangeable. In extremely dirty areas, it may be economical to add prefilters, which can be done at any time.

For extremely critical requirements, ABSOLUTE® filters can be added downstream. The excellent prefiltering they receive assures very long life.

This flexibility makes it possible to get the proper filtering at the lowest cost and without major changes in the filter system.

## What is a **POSITIVE** Filter?



A positive filter is one which will not accidentally spill accumulated dirt downstream, is not dependent upon auxiliary equipment, does not lose efficiency because of dirt loading, and permits maintenance without danger of contaminating the downstream duct system.

All Cambridge Filters are positive, strainer-type filters, which operate on simple, fool-proof principles, such as making the openings between the filter fibers smaller than the particles which the filter is designed to stop.

Instead of losing efficiency as dirt is collected, all Cambridge filters actually increase in efficiency until pressure drop across the filters gradually increases to the design point for changing filters. Because of the relatively low initial pressure drop and the exceptionally large dirt-holding capacity, service life is unusually long.



# WHAT ABOUT COST?

Until the development of the Cambridge AEROSOLVE Filters, many air-cleaning jobs had to be an inadequate "second best" because of the high cost of high-efficiency equipment. With the AEROSOLVE filter, the desired high efficiency can be obtained at a fraction of the former cost of high-efficiency equipment, so that practical consideration can now be given to high efficiency on all process

and comfort conditioning jobs.

In addition, Cambridge filters keep capital expenditure to the minimum, since even the cost of the initial filter cartridges can be charged off as an expense. The permanent frames are easily installed — no electric, water or drain connections or auxiliary equipment are required, and no skilled trades are necessary.

# EASE OF MAINTENANCE

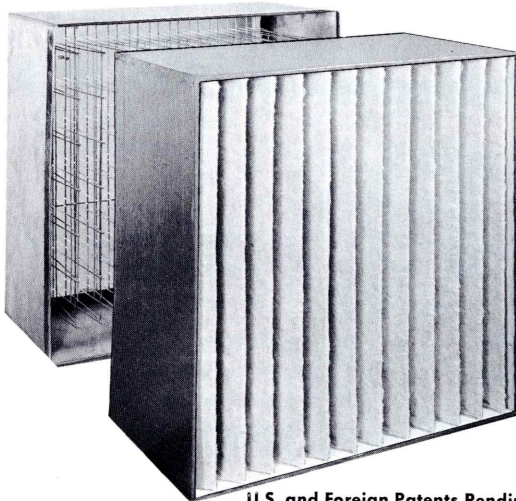
Cambridge filters require no maintenance, except for infrequent replacement.

With the ABSOLUTE Filter, all that is necessary is to remove the sealing tape, replace the filters, and apply new tape.

With the AEROSOLVE Filter, the quick-acting fasteners are easily removed, the cartridges taken out, and new

cartridges slipped into place. Each cartridge, which weighs less than five pounds, serves as a box for carrying out the dirt accumulated in the deep pleats. The cartridge can then be collapsed diagonally for compact disposal.

No skilled trades are involved. Anyone can change Cambridge Filters.



U.S. and Foreign Patents Pending

## Cambridge

# AEROSOLVE® Filters

Efficiencies of 35% to over 90%

(N.B.S. Discoloration Test on Atmospheric Dust.)

Cambridge AEROSOLVE filters provide positive, high efficiency (in the electronic precipitator range) air cleaning for comfort and industrial air conditioning and ventilation applications. No other strainer-type filter of comparable efficiency approaches the initial low pressure drop of these filters, 0.16" to 0.35" wg.

### EASILY INSTALLED

The cadmium-plated permanent frames of the AEROSOLVE filter are designed so that replaceable cartridges of any of the three available efficiencies can be used. Specially designed support plates and overlapping edges hold the filters in place and provide a seal between frames. The cartridges slide easily into place and are held by quick-acting fasteners.

No water, oil, electric or drain connections are required and only one building trade is involved.

### EASY TO MAINTAIN

The AEROSOLVE filter requires no maintenance beyond infrequent cartridge replacement. The cartridges are light in weight (five lb.) and easily handled. Held in a horizontal position, they serve as a spill-proof box for the accumulated dirt which is retained by the deep pleats. Once removed, they can be collapsed diagonally for compact disposal. No special skill is required for quick installation of the replacement cartridges.

### WIDE FLEXIBILITY

All AEROSOLVE filter cartridges are interchangeable. When advisable, cartridges of higher or lower efficiency can be substituted without further change in the filter system. Provision is also made for easily adding prefilters or protective screens.

### LONG LIFE

A 1000 c.f.m. AEROSOLVE filter has a surface area of 43 sq. ft. and the special glass medium also provides filtration in depth, so that the dirt-holding capacity provides service life much greater than that of far less efficient filters.

### LOW COST

The initial installed cost of AEROSOLVE filters is often a small fraction of that of other air cleaning devices of comparable efficiencies, and the total annual cost per 1000 c.f.m. is also considerably less.



# Cambridge

# ABSOLUTE<sup>®</sup> Filter

World's Most Efficient Air-Cleaning Device

Guaranteed 99.97% Efficient on 0.3 Micron Diameter Particles

This is the filter which was specially developed to remove radioactive particles from the air in atomic energy installations and which has been declassified for industrial and scientific use where the highest degree of air cleaning is required.

The ABSOLUTE filter was specifically designed to remove 0.3 micron particles since this size is considered the most difficult to filter out of the air. Larger particles are readily "strained out" by the filter medium, whereas smaller particles tend to be deflected (Brownian movement) and caught. Every filter is individually tested and stamped with the actual penetration (guaranteed not more than 0.03%).

### EASY TO INSTALL

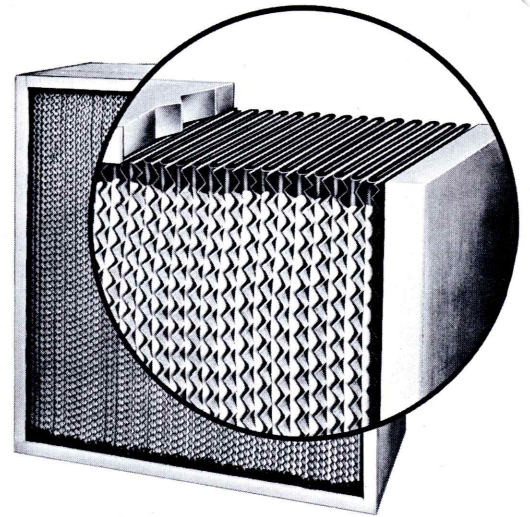
Assembly of ABSOLUTE filter banks is extremely simple. These special throw-away filters are set in place like building blocks and special sealing tape applied to the joints. No power is needed — no water or drain lines. No special trades are required.

### EASY TO MAINTAIN

The ABSOLUTE filter requires no maintenance, beyond infrequent replacement which is easily done by one man. No special skills are needed.

### LONG LIFE

Because of the tremendous amount of filter area — 200 sq. ft. for a 1000 c.f.m. unit — the ABSOLUTE filter has exceptional dirt-holding capacity which results in long



U.S. and Foreign Patents Apply

filter life. Depending upon the amount of dirt in the air and the type of prefiltering, filter life generally ranges from 8,000 to 20,000 hours.

### PRESSURE DROP

The ratio of air flow resistance to efficiency of the ABSOLUTE filter is unusually low — 1.0" w.g. for a clean filter at rated air flow.

### LOW COST

In relation to the efficiency, the annual owning and operating cost of ABSOLUTE filters is exceptionally low.

## TYPICAL CAMBRIDGE FILTER APPLICATIONS

### HEALTH, BACTERIA

Pharmaceutical  
Hospitals  
Breweries  
Cheese Plants  
Radioactive Areas  
Laboratories  
Food Plants  
Animal Rooms

### MAGNIFICATION

Photographic Film  
TV Tubes  
Clear Plastics

### SMOKE

Clubs  
Restaurants  
Bowling Alleys  
Auditoriums  
Conference Rooms

### PRECISION

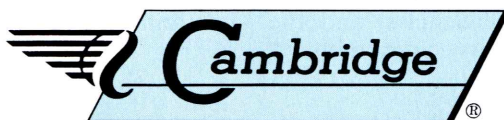
Ball Bearings  
Spinnerettes  
Electronics  
Instruments

### CLEANLINESS

Computers  
Universities  
Retail Stores  
Industrial Buildings  
Homes  
Processing Areas  
Radioactive Areas  
Textiles  
Radar Stations  
Telephone Exchanges  
Offices  
Laboratories

## A Few Cambridge Filter Users

General Electric Company  
E. I. du Pont de Nemours & Co., Inc.  
Ford Motor Company  
Union Carbide & Carbon Corp.  
Monsanto Chemical Corp.  
University of Chicago  
Massachusetts Institute of Technology  
Eastman Kodak Company  
Carrier Corporation  
Bristol Laboratories, Inc.  
Dow Chemical Company  
Westinghouse Electric Corp.  
General Motors Corp.  
Charles Pfizer & Co., Inc.



## Cambridge Filter Corporation

738 E. Erie Blvd. Syracuse 3, N. Y.



# What do you mean, "CLEAN AIR"?

Clean air is a matter of degree. Air which by some standards has been "filtered" is much too dirty for many applications. In selecting filters, one fact must be kept in mind —

## Invisible, Smudge-Producing Particles GO RIGHT THROUGH Most Filters

Only a small percentage of the dust in the atmosphere is visible. Consequently, filters which are reasonably efficient on large dust particles (see ASHAE test below) are much less efficient on atmospheric dust (N.B.S. test) and practically worthless on smoke (DOP test).

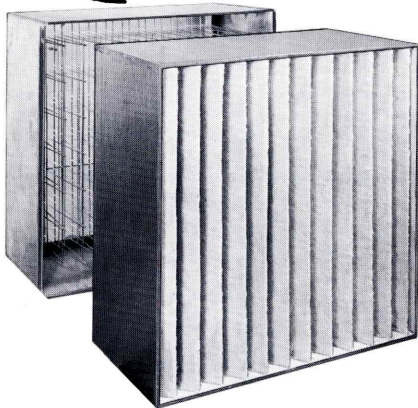
### STANDARD TESTS — PERCENTAGE OF EFFICIENCY

TYPE FILTER	ASHAE (Weight Test)	NBS TEST # (Atmospheric Dust)	DOP TEST (0.3 Micron Smoke)
Cambridge Absolute	*	*	**99.95 Min.
Cambridge Aerosolve 95	*	90-95	80-85
Cambridge Aerosolve 85	99	80-85	50-60
Cambridge Aerosolve 35	96	30-35	20-30
Electronic Precipitator	99	85-90	60-70
Automatic	76	8-12	2-5
Panel	76	8-12	2-5

\*Practically 100%. Test not practical for more accurate reading.

#National Bureau of Standards Discoloration Test.

\*\*Maximum Allowable Penetration of Dioctyl Phthalate Smoke 0.05%. Every filter individually tested.



## Cambridge AEROSOLVE® Filters

Available in Range  
to Meet YOUR  
High-Efficiency Needs

Cartridges Interchangeable  
to Meet Changes in Process  
or Supply-Air Conditions

The annual owning and operating costs of Cambridge Aerosolve Filters are so low that high efficiency air filtration is now practical on all process and comfort conditioning jobs. Cartridges of three available efficiencies fit the same cadmium-plated permanent frames, so that cartridges of higher or lower efficiency can be substituted without change in the filter system.

They are easy and inexpensive to install, and there is no maintenance except infrequent, easy cartridge replacement. Service life is much greater even than that of far less efficient filters.

Write for Bulletin 120

## Cambridge Filter Corporation

738 E. Erie Blvd., Syracuse 3, N. Y.

Also Makers of the Famous ABSOLUTE® Filter—

World's Most Efficient Air Cleaning Device

### TYPICAL CAMBRIDGE FILTER INSTALLATIONS

#### INDUSTRIAL

Fafnir Bearing, New Britain	Aerosolve 85
Sperry Rand Corp., New York	Aerosolve 95 & 35
Tracerlab, Waltham, Mass.	Absolute, Aerosolve 85 & 35
Firestone, Cleveland	Aerosolve 85
R.C.A. (Color TV) Lancaster, Pa.	Absolute, Aerosolve 95
Proctor & Gamble, Chicago	Aerosolve 95
Hughes Aircraft, El Segundo, Cal.	Aerosolve 95
Parke Davis, Rochester, Mich.	Absolute
Boonton Molding Co., New York	Absolute

#### ELECTRONIC COMPUTER

Mass. Institute of Technology	Aerosolve 85
Ford Motor Co., Detroit	Aerosolve 85
Rand Corporation, Los Angeles	Aerosolve 95

#### HOSPITAL

Emerson Hospital, Cambridge, Mass.	Aerosolve 35
Mt. Sinai Hospital, New York	Aerosolve 95
Misericordia Hospital, Phila.	Aerosolve 95

#### LABORATORY

Dupont-Eastern Lab., Gibbstown, New Jersey	Aerosolve 85
Phoenix Memorial Lab., University of Michigan	Absolute
Dow Chemical, Nuclear Research Lab., Midland, Mich.	Absolute
Sperry Rand Corp., Lake Success, N. Y.	Absolute, Aerosolve 95

#### OFFICE BUILDING

State Mutual Life, Worcester	Aerosolve 95
Carrier Corp., Syracuse	Aerosolve 35
Eastman Kodak, Rochester	Aerosolve 85
Fieldcrest Mills, N. Carolina	Aerosolve 95

#### LIBRARY, MUSEUM

Norfolk Museum of Arts and Sciences	Aerosolve 85
Union Theo. Seminary, New York	Aerosolve 85
New Orleans Public Library	Aerosolve 85

#### UNIVERSITY

Mass. Inst. of Technology	Aerosolve 35 & 85
New York University	Aerosolve 95
Wayne University	Aerosolve 85

#### RESTAURANT

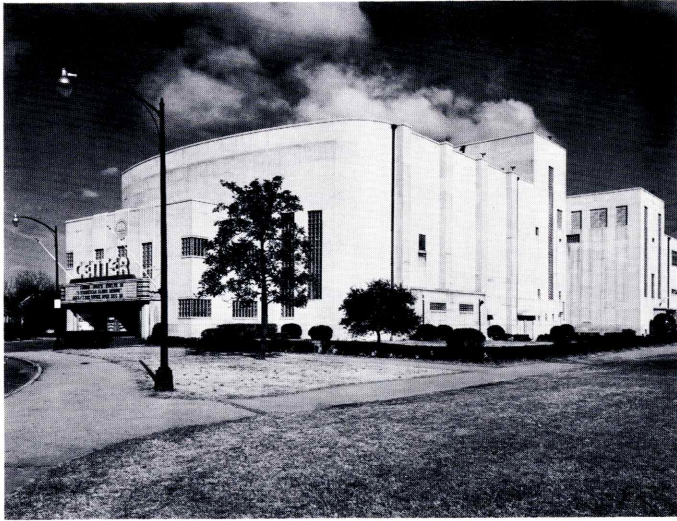
Creve Coeur Club, Peoria, Ill.	Aerosolve 95
McCluskey's Steak House, L. I.	Aerosolve 95
The Club, Birmingham, Ala.	Aerosolve 85

REPRESENTATIVES IN PRINCIPAL CITIES



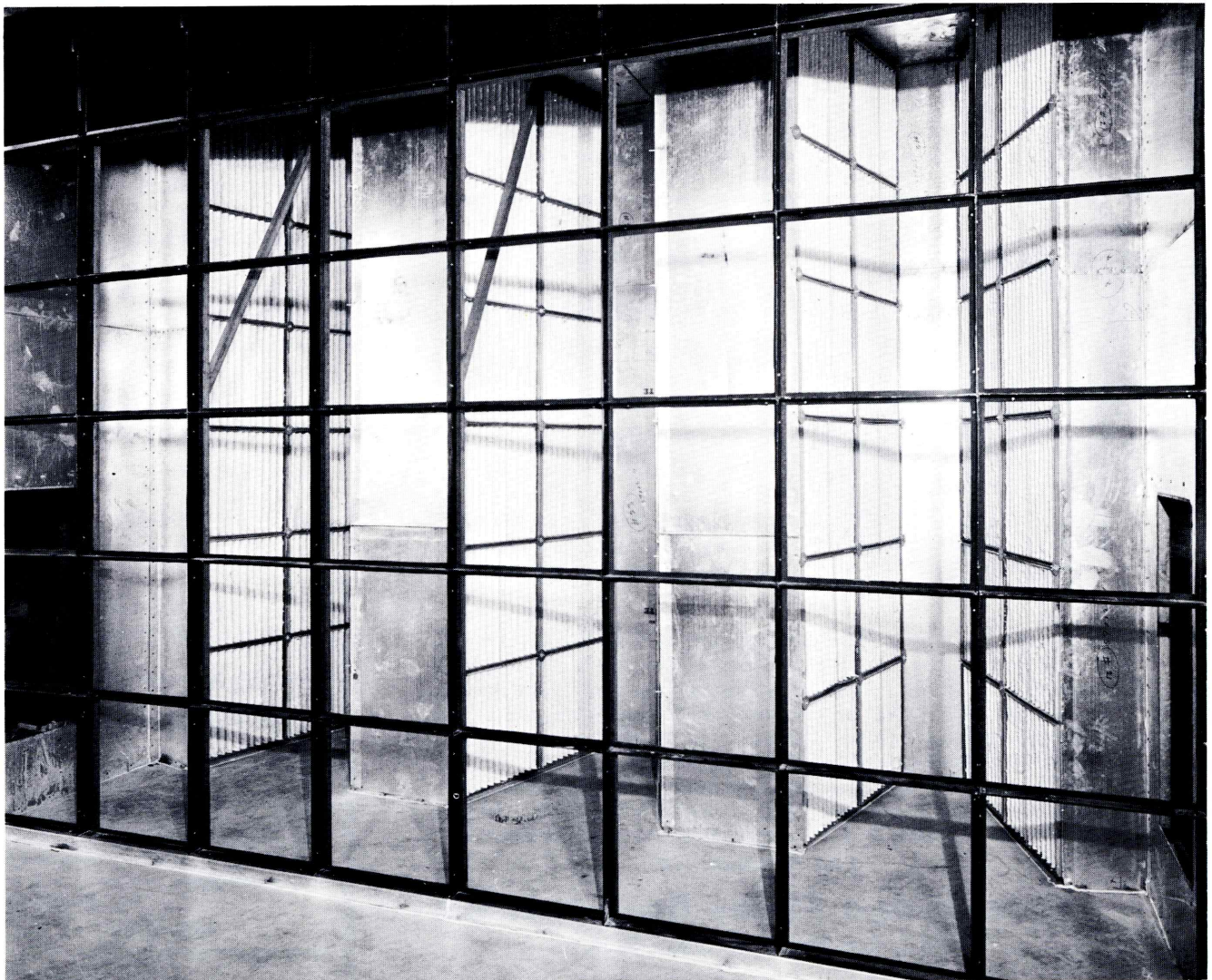
# Norfolk Arena and Centre Theatre

## Norfolk, Virginia



In the Arena area, used for sports events, exhibitions, banquets and ships parties, considerable trouble had been experienced from tobacco smoke. In the new air conditioning system, Cambridge Aerosolve 95 filters are used to remove smoke and to reduce the amount of outside air required for odor dilution.

Seventy-two Aerosolve 95 filters are arranged in V-banks to handle the 72,000 C.F.M. requirements, with a flat bank of panel-type washable pre-filters to remove coarse dust. Results have been most satisfactory and the service life of the Aerosolve filters is conservatively estimated at one year.



*Prefilters removed to show Cambridge AEROSOLVE 95 Filters in V-banks*