



March 19, 1984

Procedure #29Vent System Characteristics & Monitoring

- I.) The Building System, designed to provide negative pressure on the building at 6 air changes per hour, consists of the following:
- A.) Fan system-Bayley Model BC-135 Backward incline blower, 2hp, adjustable V-Belt drive, with a rated capacity of 2934 CFM.
 - B.) Filter system-American Air Filter Astro Seal 500 Housing with prefilter cartridge capacity rated at 3200 CFM. (See Astro Seal 500 spec sheet)
 - 1.) Astro Cel III High capacity filters rated at 1600 CFM @ 1.0" sp & DOP tested.
 - 2.) AM-Air 300 prefilters, 2" size, rated for Housing & face velocity with 25-30% efficiency. (See spec sheet AM-Air)
 - C.) Operation of this system shall be monitored on a daily basis, when in use, for the parameters of static pressure increase & radiation level at external surface of Astro Seal Housing.
 - 1.) Dwyer magnehelic gauges rated to 2.0" sp will be used to measure static pressure increase as the filter systems begin to occlude with dust. Readings will be recorded on a daily Log sheet. (See spec sheet)
 - 2.) A daily Log sheet will be kept to record radiation readings performed with the Wm.B.Johnson GSM-5. These readings will be performed at surface of the Astro Seal 500 Housing.
- II.) The Old Cell system designed to provide negative pressure on the Enclosure at 15 air changes per hour, consists of the following:
- A.) Fan system-Bayley Model BC-122 Backward incline blower, 3/4 hp, adjustable V-Belt drive, with a rated capacity of 1525 CFM.
 - B.) Filter system-American Air Filter Astro Seal 500 Housing with prefilter cartridge capacity rated @ 1600 CFM.
 - 1.) Astro Cel III High capacity filters rated at 1600 CFM @ 1.0" sp & DOP tested.
 - 2.) AM-Air 300 prefilters, 2" size, rated for housing & face velocity with 25-30% efficiency. (See spec

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sheets)

C.) Monitoring of this system shall be the same as the Building System.

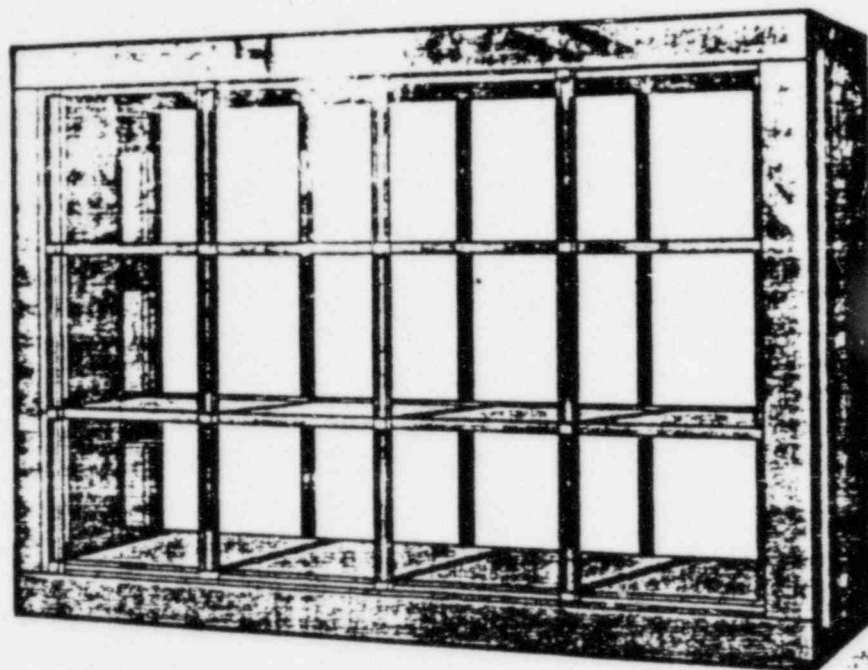
To ensure the maximum filtration efficiency & proper volume throughput (CFM) both systems will be monitored as previously designated. At a static pressure increase of 1.0" the prefilter mechanisms will be replaced. Spent filter components will be bagged when retrieved from the Astro Seal Housings & remanded to waste drums.

Prior to initial use of systems DOP testing will be performed to assure proper installation of filters in the enclosure housings. Performance of the systems to monitor Co60 contamination on the discharge side of the filter systems will be performed every other day to assure that proper filter performance is maintained. The Gillian Air sampler systems will be employed for this use. The results of these discharge air samples will be recorded on the daily Log sheets.

Procedure #10 previously submitted includes the characteristics of both systems based on concept & volume throughput. Included are diagrams of the Building System & the Old Cell System.

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AstroSEAL® 500 HOUSING

Side Access Service for your High Efficiency Filtration System

The AstroSEAL® 500 Housing offers the convenience of servicing high efficiency particulate air (HEPA) and other high efficiency filter cartridges. This compact side-access housing renders front or rear access to the filter bank unnecessary, reducing ductwork and the amount of space it occupies for economical, efficient filtration system maintenance.

The AstroSEAL® 500 Housing is installed in-line to hold air filters securely in place in high pressure systems supplying ultra-clean air for electronics, pharmaceutical, food, aerospace hardware, medical, and other high efficiency air cleaning applications.

RUGGED CONSTRUCTION

Constructed from 16-gauge galvanized steel, the AstroSEAL® 500 Housing features wide flanges, heavy-duty corner bracing, and vertical supports spaced every two feet, both for added structural support and to seal the cartridge filters.

Flanges on the AstroSEAL® 500 Housing are turned in on both air entering and air leaving sides to provide a flush exterior and a matching appearance with air handling units. This construction permits outdoor installation with conventional field weatherproofing.

A heavy-duty single thickness hinged door, Neoprene rubber gaskets and variable pressure latches ensure a positive seal, making the unit exceptionally suited for use in high pressure systems.

All seams of the AstroSEAL® 500 Housing are hand-caulked to minimize small leaks which could bypass the filter cartridges. Before leaving the factory, each housing is pressurized to 3" W.G. and leak tested to ensure its integrity. AstroSEAL® 500 Housings are fabricated to withstand up to 5" W.G. pressure, although some air leakage may occur at the doors above 3" W.G. positive pressure.

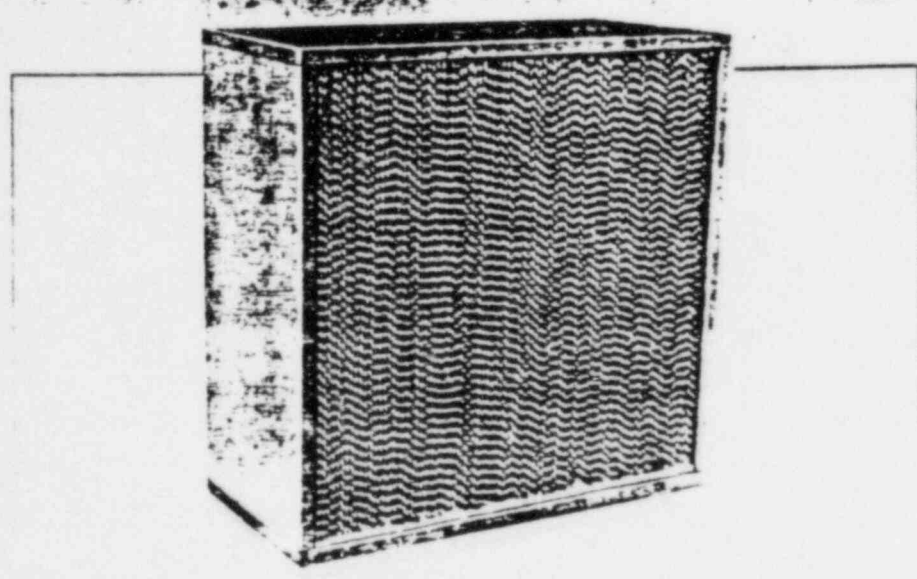
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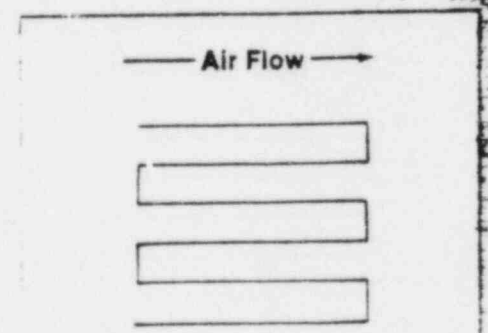


HIGH CAPACITY ASTROCEL I HEPA FILTER

A Revolutionary New Design Featuring
Long Life and Low Initial Resistance



HEPA Filter
Media Pleating



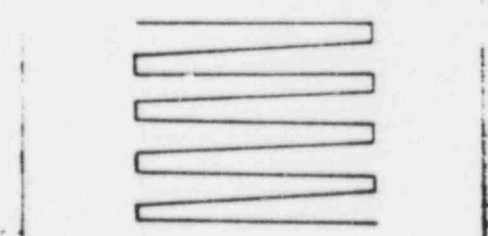
Media Cross-Section
with Standard Separators
(Top View)

The American Air Filter high capacity Astrocel I HEPA filter utilizes a uniquely designed tapered separator construction. The tapered separator construction results in more media per filter compared to HEPA filters made with standard separators.

Compared to conventional HEPA filters rated at 1150 CFM at 1" W.G., the high capacity Astrocel I HEPA filter with more media has a longer life. The high capacity filter is rated at 1765 CFM at 1" W.G.

The high capacity Astrocel I HEPA filter is constructed with fire retardant particle board cell sides, aluminum separators, water proof fiberglass media, polyurethane foam bond and neoprene rubber gaskets. Options include plywood or metal cell sides, vinyl coated aluminum separators and neoprene rubber sealant.

Each high capacity Astrocel I HEPA filter is factory tested and is guaranteed to be 99.97% efficiency on .3 micron thermally generated DOP particles.



Media Cross-Section
with Tapered Separators
(Top View)

AM-AIR

EXTENDED SURFACE
SUPPORTED
PLEAT FILTERS
PANEL TYPE



Recommended as prefilter for high efficiency filters or where lower efficiency filtration is required.

Applications

AM-AIR filters are designed to operate in the 300 to 500 FPM filter face velocity range. (Four inch deep sizes can go up to 625 FPM.) They provide significantly higher efficiency than disposable panel filters, permanent filters or media pads in metal frames. AM-AIR filters are highly recommended for applications where these types of filters are presently being used and a higher level of air cleaning is desired.

AM-AIR filters are also directly interchangeable with panel type filters without modification to the holding frames or latching devices.

Product Description

AM-AIR 300 filters — Top-of-the-line performance and value — AM-AIR 300 filters consist of a white pleated media pack enclosed in a blue, heavy duty chipboard frame. The media is a blend of cotton and synthetic fibers. Three thicknesses are available — 1", 2", and 4". They are unusually strong and will not rack or warp with normal handling or under normal operating conditions. High dust holding capacity provides extra long service life, best value.

AM-AIR 100 filters — Economy grade — AM-AIR 100 filters are designed for applications where low initial purchase price is the primary consideration. They are constructed using the same media and frame as AM-AIR 300 filters, except with fewer pleats. They provide the same air cleaning efficiency as AM-AIR 300 filters. Two thicknesses are available — 2" and 4".

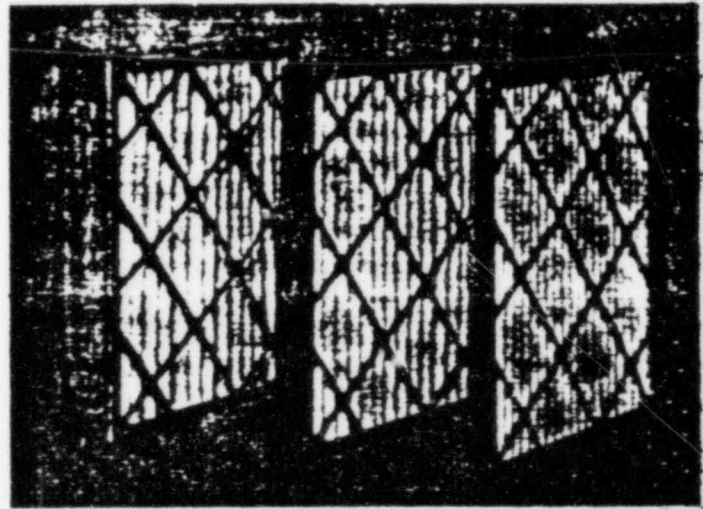
Pleated Media Design Provides Higher Efficiency, Optimum Air Flow

The design of AM-AIR pleats creates a wide space between adjacent pleats on the air leaving side. Air can freely exit along the entire depth of each pleat resulting in optimum air flow with minimum resistance. Dirt collects evenly along each pleat, fully utilizing all the media.

An expanded metal grid is bonded to the air leaving side to support the media and prevent it from moving when exposed to the force and turbulence of the air flow. The metal grid also maintains the uniform shape of the pleats to assure proper air flow and maximum dust loading at rated filter face velocities.

Double Wall Construction Assures Extra Rigidity

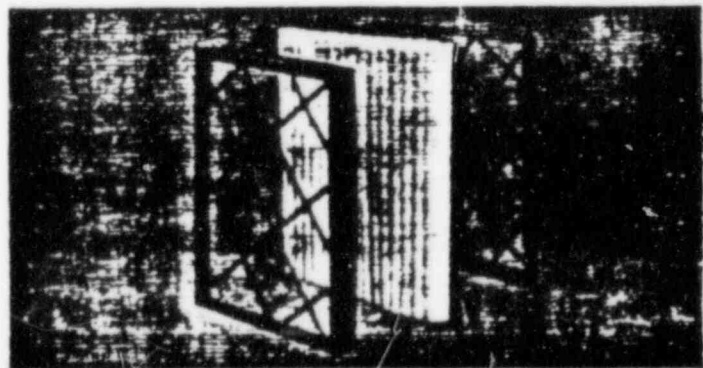
The frame of AM-AIR filters is die-cut from two pieces of heavy duty chipboard, one for the air entering side and one for the air leaving side. When assembled, the two mating halves of the frame overlap one another to provide a double wall on all four sides. The pleated media pack is bonded to the inside of the frame, forming a totally unitized construction. This strong bond also provides a positive seal against leakage.



AM-AIR 300 and 100 filters are available in a wide range of standard sizes. Special size AM-AIR 300 filters are also available. (See footnote 4 on reverse side for description.)



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2000 SERIES MAGNEHELIC AIR FILTER GAGES

DIAPHRAGM ACTUATED DIRECT READING DIAL TYPE

ACCURATE TO $\pm 2\%$ OF FULL SCALE

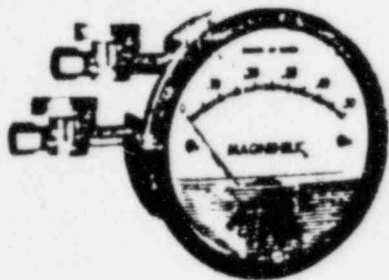


Fig. 4-1. MAGNEHELIC gage with molded plastic vent valves for easy zeroing. Available with adjustable signal flag (not shown; option "ASF" at extra cost) for immediate visual reference to maximum allowable pressure drop. External front screw for zero adjustment. Red and green scale overlays to highlight safe and dangerous readings are also available.

STANDARD ACCESSORIES FURNISHED



Fig. 4-2. Standard gage mounting accessories furnished are two $\frac{1}{4}$ " NPT plugs for duplicate pressure taps, two $\frac{1}{4}$ " pipe thread to rubber tubing adapters, solid back mounting stud hollow mounting stud, flush mounting adapters.



Fig. 4-3. Air Filter accessories furnished are mounting panel with necessary screws, two static pressure tips with integral compression fittings, two five foot lengths of $\frac{1}{4}$ " aluminum tubing and the two molded plastic vent valve with compression fittings also shown installed on the gage in Fig. 4-1.

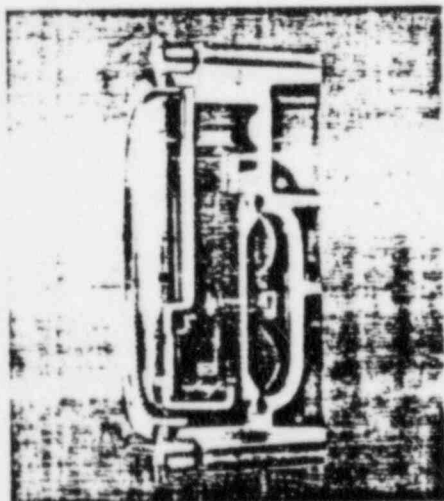


Fig. 4-4. Cutaway view of the MAGNEHELIC gage showing the actuating diaphragm, the leaf spring with magnet, the helix which turns the indicating pointer in response to the position of the magnet without mechanical linkages.

FEATURES

- Easiest reading for personnel accustomed to dial type gages.
- Lowest cost pointer type gage.
- Easy zeroing with molded plastic vent valves.
- Sensitivity to 0.01" W.C.
- Withstands vibration.
- Unaffected by over range pressure surges.

OPERATING RANGES AVAILABLE

Model No.	Range	Minor Divisions
2000-0-AF	0-5" water	0.01"
2001-AF	0-1" water	0.02"
2002-AF	0-2" water	0.05"
2003-AF	0-3" water	0.10"
2004-AF	0-4" water	0.10"

SPECIFICATIONS

Weight of Gage: 1 lb. 2 oz.

Finish: Case and aluminum parts Iridite dipped to withstand 168 hour salt spray test. Exterior finished in baked dark gray hammerloid.

Gage Connections: $\frac{1}{4}$ " NPT high and low pressure taps, duplicated, one pair side and one pair back.

Gage Dimensions:

Diameter of bezel, $4\frac{3}{4}$ "

Diameter of body, $4\frac{1}{2}$ "

Depth of body to bezel, $1\frac{1}{4}$ "

Accuracy: Plus or minus 2% full scale, throughout range at 70° F.

Maximum Total Pressure Rating: Sustained or highly repetitive pressure 15 psi.

Ambient Temperature Range: 30° to 140° F.

OPERATION

The MAGNEHELIC gage consists of two pressure-tight compartments separated by a molded flexible diaphragm.

The interior of the gage case serves as the "high" pressure compartment and a sealed chamber behind the diaphragm serves as the "low" pressure compartment.

Differences in pressure between the "high" and "low" sides of the diaphragm cause the diaphragm to assume a balanced position between the two pressures. The front support plate of the diaphragm is linked to a leaf spring which is anchored at one end. The spring provides calibrated resistance to the diaphragm motion. Motion of the spring is transmitted through an exclusive magnetic linkage to the pointer.

The MAGNEHELIC gage requires no maintenance. The only field adjustment required is occasional zero setting

of the pointer which is done by opening the plastic vent valves and turning the adjustment of the gage.

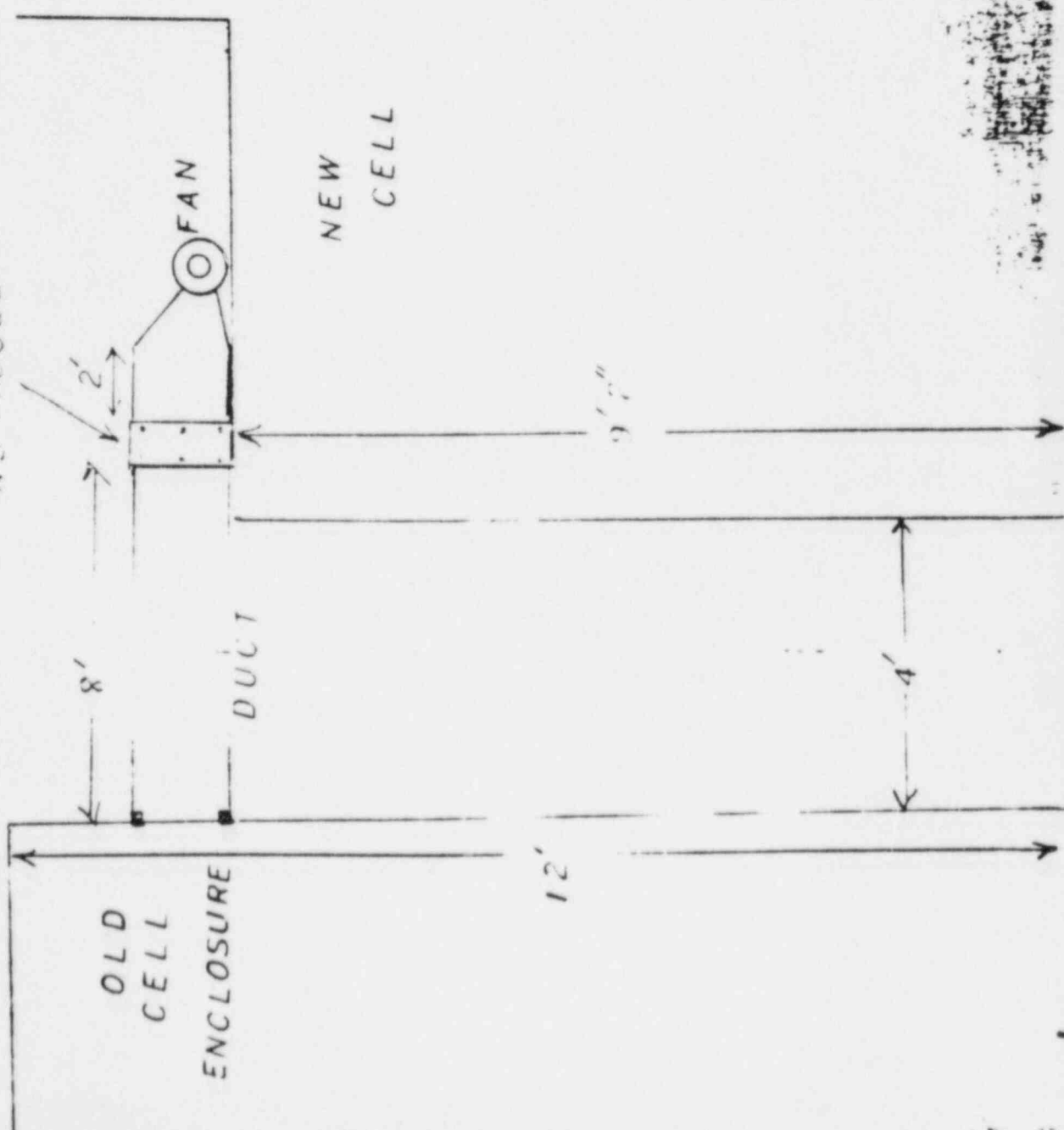
Recommended installation is shown in Fig. 2-1 on page 2, and also in Installation Bulletin A-25.

SUGGESTED SPECIFICATION for Architects and Engineers

An air filter gage for measuring the resistance to air flow through the filters shall be installed, one for each bank of filters. The gage shall be diaphragm actuated, shall have $3\frac{3}{4}$ " diameter white dial with black figures and graduations, shall have pointer zero adjustment and shall be furnished complete with two static pressure tips, fittings for $\frac{1}{4}$ " metal tubing and means for mounting the gage. Gage shall be the Catalog No. _____ reading to _____" water, in _____ divisions as manufactured by Dwyer Instruments, Inc.

More detailed information on the design, construction and operation of MAGNEHELIC gages as well as data on other ranges and other applications is given in Bulletin No. A-30, available on request.

ASTROCEL



DUCT

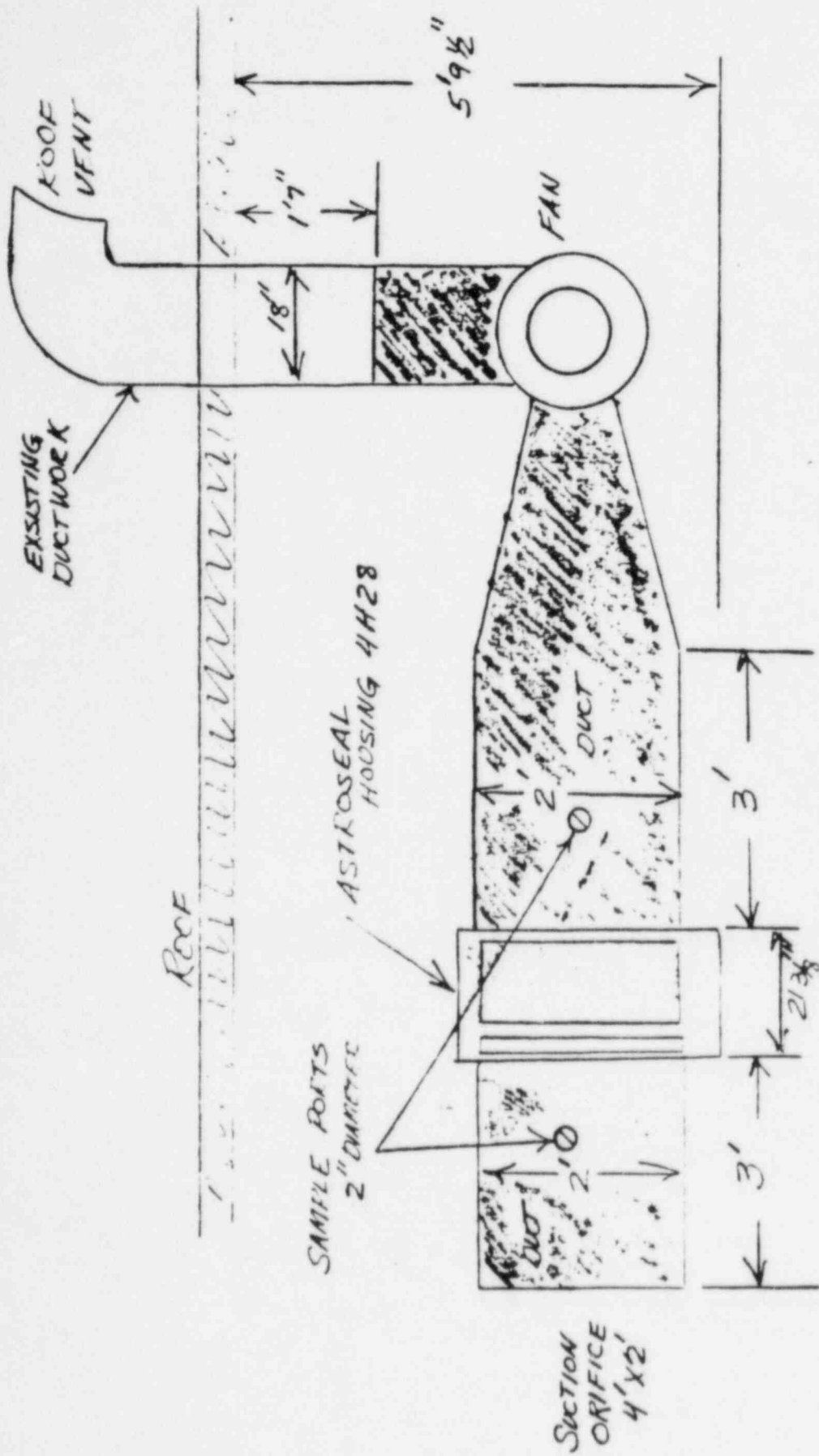
FAN

NEW
CELL

OLD
CELL
ENCLOSURE

DUCT 2' x 2'
FAN SUCT ION 10"

OLD CELL SYSTEM



BUILDING SYSTEM

3000 CFM UNIT ASTROSEAL 500 4H28 HCF-4



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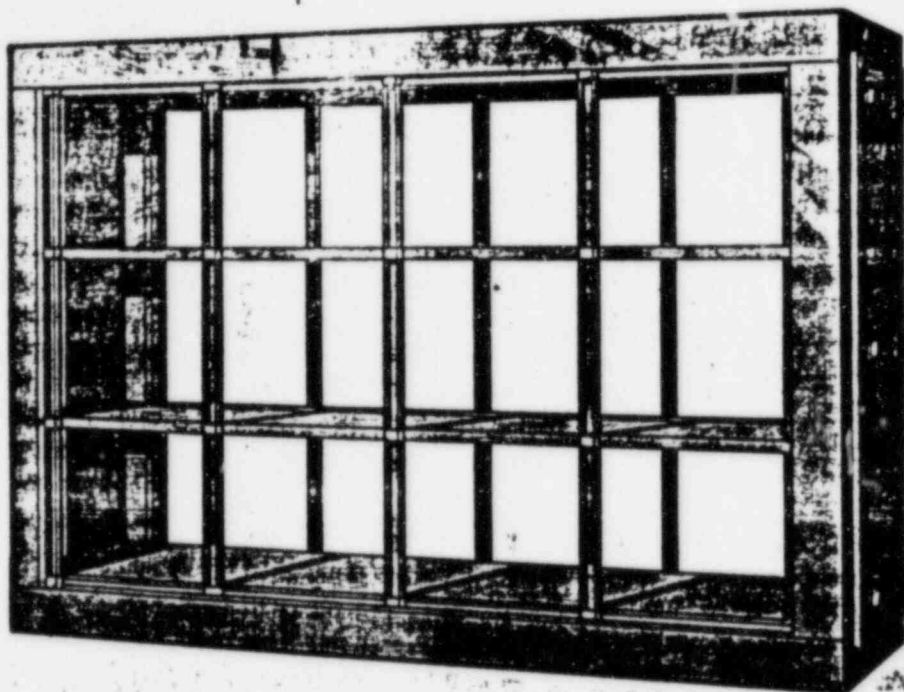
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RUGGED CONSTRUCTION

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Flanges on the AstroSEAL® 500 Housing are turned in on both air entering and air leaving sides to provide a flush exterior and a matching appearance with air handling units. This construction permits outdoor installation with conventional field weatherproofing.

A heavy-duty single thickness hinged door, Neoprene rubber gaskets and variable pressure latches endure a positive seal, making the unit exceptionally suited for use in high pressure systems.

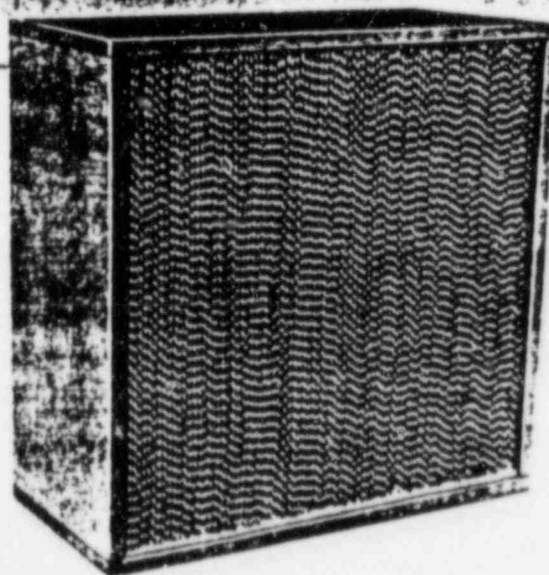
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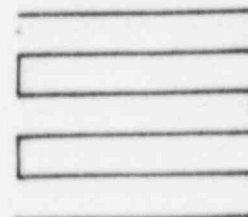
HIGH CAPACITY ASTROCEL I HEPA FILTER

A Revolutionary New Design Featuring
Long Life and Low Initial Resistance

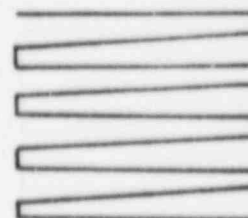


HEPA Filter
Media Pleating

— Air Flow —→



Media Cross-Section
with Standard Separators
(Top View)



Media Cross-Section
with Tapered Separators
(Top View)

The American Air Filter high capacity Astrocel I HEPA filter utilizes a uniquely designed tapered separator construction. The tapered separator construction results in more media per filter compared to HEPA filters made with standard separators.

Compared to conventional HEPA filters rated at 1150 CFM at 1" W.G., the high capacity Astrocel I HEPA filter with more media has a longer life. The high capacity filter is rated at 1765 CFM at 1" W.G.

The high capacity Astrocel I HEPA filter is constructed with fire retardant particle board cell sides, aluminum separators, water proof fiberglass media, polyurethane foam bond and neoprene rubber gaskets. Options include plywood or metal cell sides, vinyl coated aluminum separators and neoprene rubber sealant.

Each high capacity Astrocel I HEPA filter is factory tested and is guaranteed to be 99.97% efficiency on .3 micron thermally generated DOP particles.

AM-AIR

AF-1314A

EXTENDED SURFACE
SUPPORTED
PLEAT FILTERS
PANEL TYPE



Recommended as prefilter for high efficiency filters or where lower efficiency filtration is required.

Applications

AM-AIR filters are designed to operate in the 300 to 500 FPM filter face velocity range. (Four inch deep sizes can go up to 625 FPM.) They provide significantly higher efficiency than disposable panel filters, permanent filters or media pads in metal frames. AM-AIR filters are highly recommended for applications where these types of filters are presently being used and a higher level of air cleaning is desired.

AM-AIR filters are also directly interchangeable with panel type filters without modification to the holding frames or latching devices.

Product Description

AM-AIR 300 filters — Top-of-the-line performance and value — AM-AIR 300 filters consist of a white pleated media pack enclosed in a blue, heavy duty chipboard frame. The media is a blend of cotton and synthetic fibers. Three thicknesses are available — 1", 2", and 4". They are unusually strong and will not rack or warp with normal handling or under normal operating conditions. High dust holding capacity provides extra long service life, best value.

AM-AIR 100 filters — Economy grade — AM-AIR 100 filters are designed for applications where low initial purchase price is the primary consideration. They are constructed using the same media and frame as AM-AIR 300 filters, except with fewer pleats. They provide the same air cleaning efficiency as AM-AIR 300 filters. Two thicknesses are available — 2" and 4".

Pleated Media Design Provides Higher Efficiency, Optimum Air Flow

The design of AM-AIR pleats creates a wide space between adjacent pleats on the air leaving side. Air can freely exit along the entire depth of each pleat resulting in optimum air flow with minimum resistance. Dirt collects evenly along each pleat, fully utilizing all the media.

An expanded metal grid is bonded to the air leaving side to support the media and prevent it from moving when exposed to the force and turbulence of the air flow. The metal grid also maintains the uniform shape of the pleats to assure proper air flow and maximum dust loading at rated filter face velocities.

Double Wall Construction Assures Extra Rigidity

The frame of AM-AIR filters is die-cut from two pieces of heavy duty chipboard, one for the air entering side and one for the air leaving side. When assembled, the two mating halves of the frame overlap one another to provide a double wall on all four sides. The pleated media pack is bonded to the inside of the frame, forming a totally unitized construction. This strong bond also



AM-AIR 300 and 100 filters are available in a wide range of standard sizes. Special size AM-AIR 300 filters are also available. (See footnote 4 on reverse side for description.)



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2000 SERIES MAGNEHELIC AIR FILTER GAGES

DIAPHRAGM ACTUATED DIRECT READING DIAL TYPE

ACCURATE TO $\pm 2\%$ OF FULL SCALE

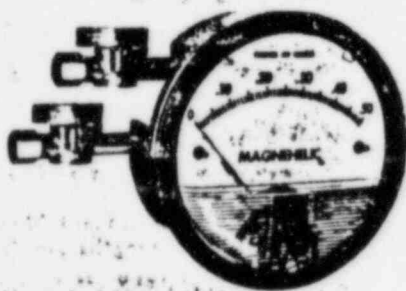


Fig. 4-1. MAGNEHELIC gage with molded plastic vent valves for easy zeroing. Available with adjustable signal flag (not shown; option "ASF" at extra cost) for immediate visual reference to maximum allowable pressure drop. External front screw for zero adjustment. Red and green scale overlays to highlight safe and dangerous readings are also available.

STANDARD ACCESSORIES FURNISHED



Fig. 4-2. Standard gage mounting accessories furnished are two $\frac{1}{8}$ " NPT plugs for duplicate pressure taps, two $\frac{1}{2}$ " pipe thread to rubber tubing adapters, solid back mounting stud hollow mounting stud, flush mounting adapters.



Fig. 4-3. Air Filter accessories furnished are mounting panel with necessary screws, two static pressure tips with integral compression fittings, two five foot lengths of $\frac{1}{4}$ " aluminum tubing and the two molded plastic vent valve with compression fittings also shown installed on the gage in Fig. 4-1.

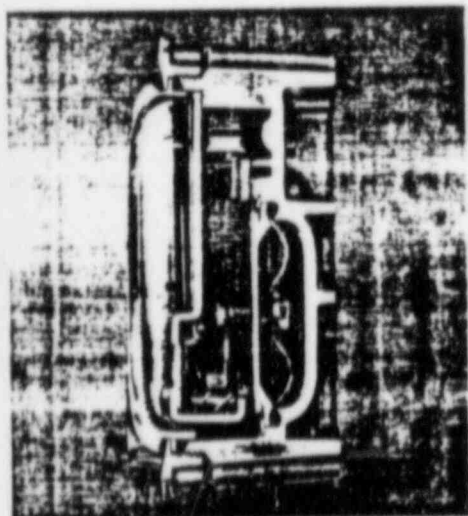


Fig. 4-4. Cutaway view of the MAGNEHELIC gage showing the actuating diaphragm, the leaf spring with magnet, the helix which turns the indicating pointer in response to the position of the magnet without mechanical linkages.

OPERATION

The MAGNEHELIC gage consists of two pressure-tight compartments separated by a molded flexible diaphragm.

The interior of the gage case serves as the "high" pressure compartment and a sealed chamber behind the diaphragm serves as the "low" pressure compartment.

Differences in pressure between the "high" and "low" sides of the diaphragm cause the diaphragm to assume a balanced position between the two pressures. The front support plate of the diaphragm is linked to a leaf spring which is anchored at one end. The spring provides calibrated resistance to the diaphragm motion. Motion of the spring is transmitted through an exclusive magnetic linkage to the pointer.

The MAGNEHELIC gage requires no maintenance. The only field adjustment required is occasional zero setting

FEATURES

- Easiest reading for personnel accustomed to dial type gages.
- Lowest cost pointer type gage.
- Easy zeroing with molded plastic vent valves.
- Sensitivity to 0.01" W.C.
- Withstands vibration.
- Unaffected by over range pressure surges.

OPERATING RANGES AVAILABLE

Model No.	Range	Minor Divisions
2000-0-AF	0-5" water	0.01"
2001-AF	0-1" water	0.02"
2002-AF	0-2" water	0.05"
2003-AF	0-3" water	0.10"
2004-AF	0-4" water	0.10"

SPECIFICATIONS

Weight of Gage: 1 lb. 2 oz.

Finish: Case and aluminum parts Iridite-dipped to withstand 168 hour salt spray test. Exterior finished in baked dark gray hammerloid.

Gage Connections: $\frac{1}{8}$ " NPT high and low pressure taps, duplicated, one pair side and one pair back.

Gage Dimensions:

Diameter of bezel, $4\frac{3}{4}$ "

Diameter of body, $4\frac{1}{2}$ "

Depth of body to bezel, $1\frac{1}{4}$ "

Accuracy: Plus or minus 2% full scale, throughout range at 70° F.

Maximum Total Pressure Rating: Sustained or highly repetitive pressure 15 psi.

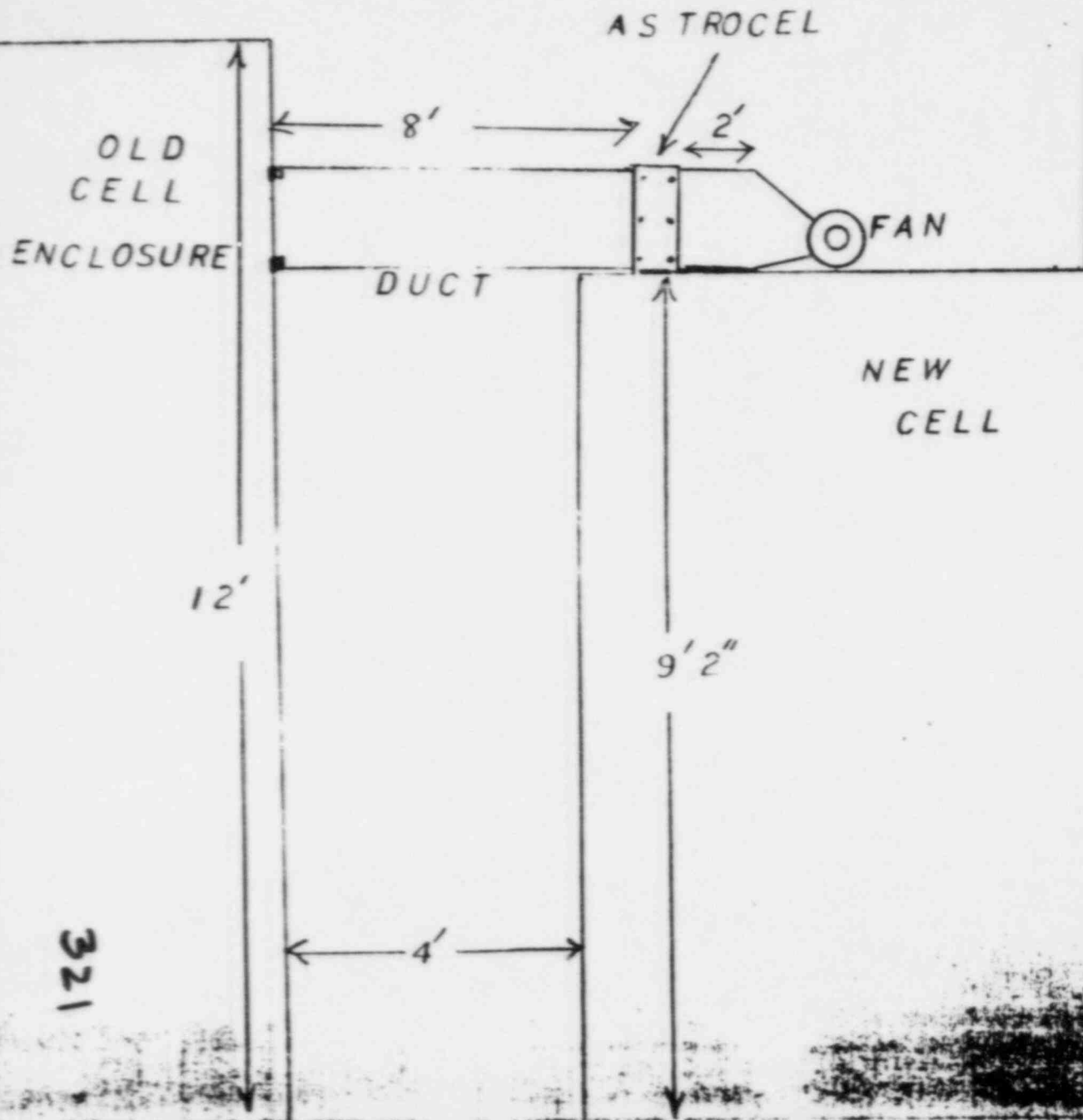
Ambient Temperature Range: 30° to 140° F.

of the pointer which is done by opening the plastic vent valves and turning the adjustment of the gage.

Recommended installation is shown in Fig. 2-1 on page 2, and also in Installation Bulletin A-28.

SUGGESTED SPECIFICATION for Architects and Engineers

An air filter gage for measuring the resistance to air flow through the filters shall be installed, one for each bank of filters. The gage shall be diaphragm actuated, shall have $3\frac{3}{4}$ " diameter white dial with black figures and graduations, shall have pointer zero adjustment and shall be furnished complete with two static pressure tips, fittings for $\frac{1}{4}$ " metal tubing and means for mounting the gage. Gage shall be the Catalog No. _____ reading to _____" water, in _____ divisions as manufactured by Dwyer Instruments, Inc.

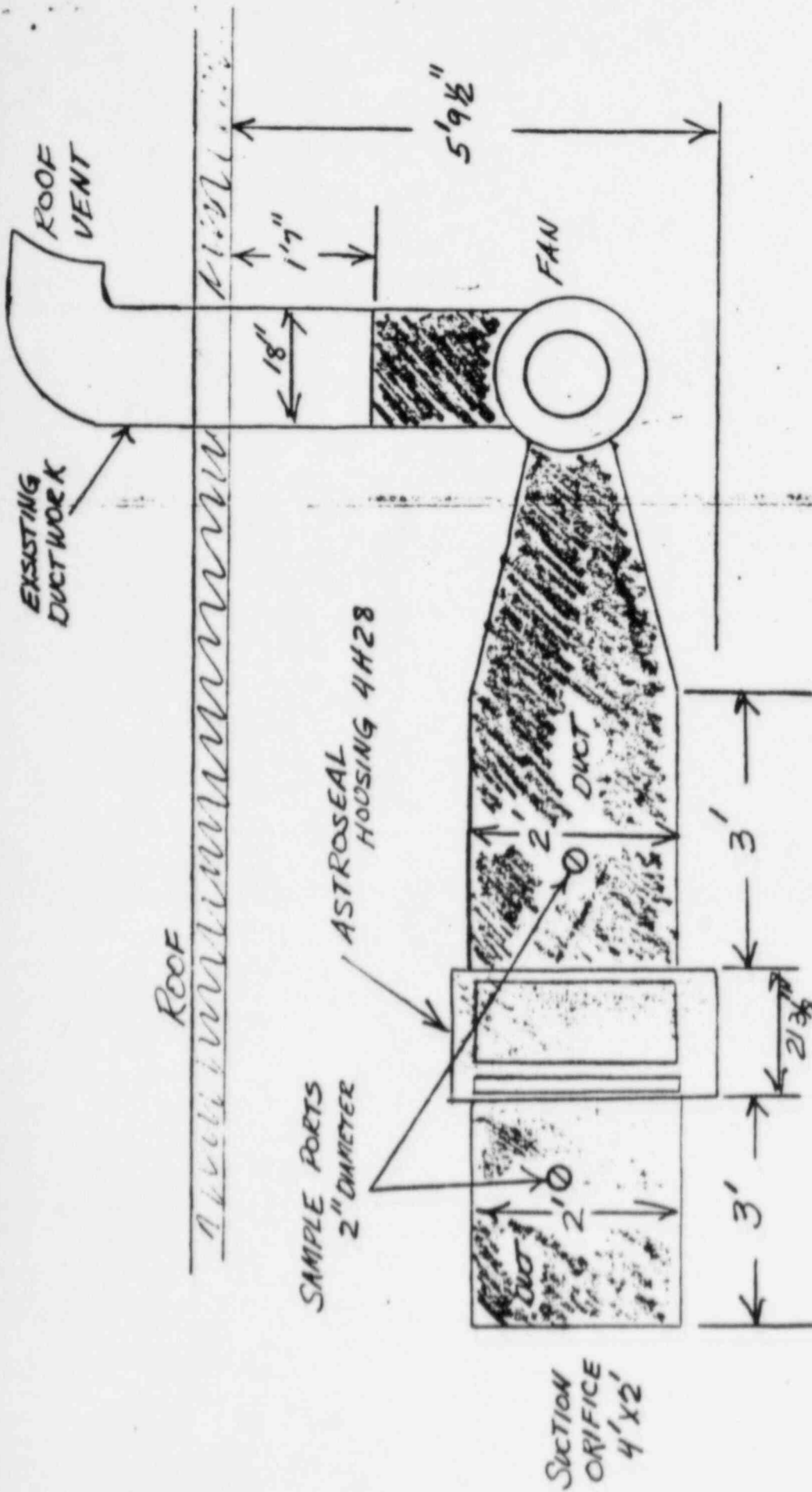


DUCT 2' x 2'.
FAN SUCTION 10"

OLD CELL SYSTEM

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BUILDING SYSTEM

3000 CFM UNIT ASTROSEAL 500 4H28 HEPA