

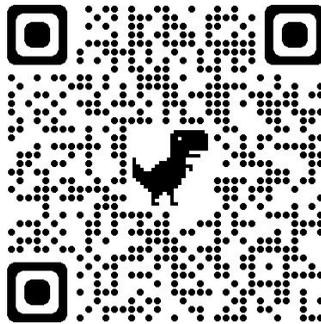


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## *General Instructions*

*(IQ, OQ)*

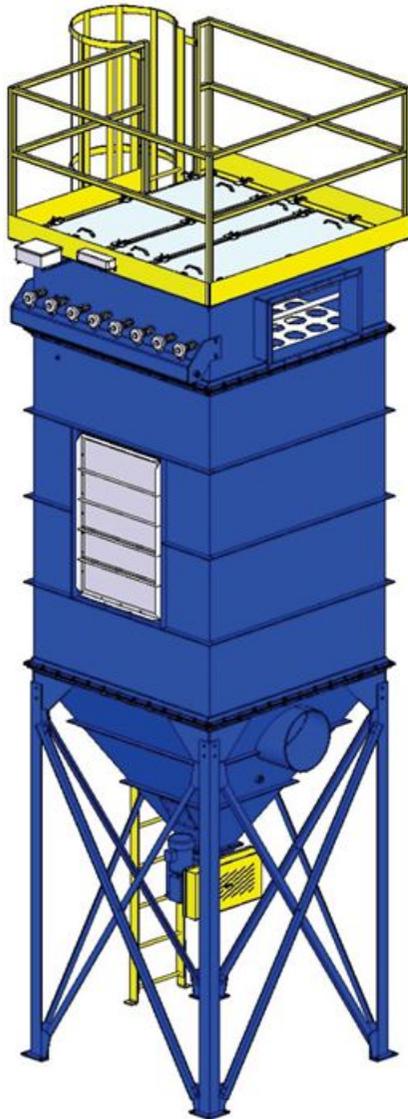
*(PULSE JET DUST COLLECTOR)*



[www.vayuvents.com](http://www.vayuvents.com)



# VAYUVENTS PRIVATE LIMITED



## PULSE JET FILTER OPERATION AND MAINTENANCE MANUAL



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NOTE: SCHEMATICS DRAWINGS LOCATED AT END OF MANUAL



# VAYUVENTS PRIVATE LIMITED

## Introduction

VAYUVENTS PRIVATE LIMITED, along with all of our employees, thank you for selecting us to fulfill your needs for environmental control equipment.

Pulse jet filters provide a mechanically simple, efficient, and economical means to separate particulate from a gas stream. The absolute minimum of moving parts enhances the efficiency and durability of the system. This manual will provide the information needed for an operator or maintenance technician to understand the process of fabric filtration and the mechanical operation of your VAYUVENTS PRIVATE LIMITED pulse jet filter. Understanding these basic principles will assure that this filter will provide years of dependable service with minimum maintenance.

## Receiving Your Equipment

A visual inspection of your equipment should be performed before it is removed from the truck. Dents, scratches, and other damage should be noted and photographed. The structural integrity of the filter housing will be adversely affected by dents. VAYUVENTS PRIVATE LIMITED should be notified of any structural damage to your equipment immediately. Packing lists should be checked thoroughly and shortages should also be reported to VAYUVENTS PRIVATE LIMITED. It is the purchaser's responsibility to file shortage reports and damage claims with the carrier and the supplier. The carrier is responsible for any damage to the equipment while it is in transit.



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## Safety Precautions

### Warnings

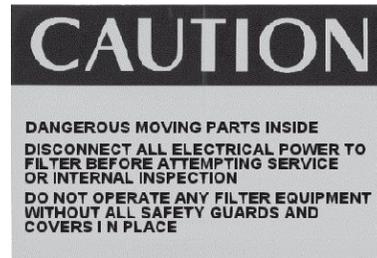
- Do not operate this equipment without guards, access doors, and covers secured.
- Lock out power before servicing this equipment.
- This equipment is automatically controlled and will start at any time without warning.
- Do not enter access plenum while system fan is operating: airflow can pull service door closed causing severe injury or entrapment.
- OSHA considers some filter housings a confined space. Follow procedures set forth by your safety administrator.



**FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE!**



**READ AND UNDERSTAND SAFETY DECALS! (See below)**





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## Definitions

<b>ACR</b>	Air to Cloth Ratio. The velocity that a gas moves through filter media. Divide the gas volumetric flow rate (CFM) by the total area of filtration media in (sq. ft.)
<b>Agglomeration</b>	To gather into a mass.
<b>Bag</b>	Filter element, sock. Usually supported by a wire cage.
<b>Blinding</b>	Filter media becomes air impermeable due to moisture, temperature, or other causes.
<b>Cake</b>	Agglomeration of dust particles on the surface of a filter element.
<b>Can Velocity</b>	Upward speed of air moving through a filter housing (FPM). Divide the gas volumetric flow (CFM) by the cross sectional area of the bag-house (sq. ft.)
<b>Cartridge Filter</b>	Filter element consisting of a pleated filter media supported on a steel or plastic skeletal frame.
<b>CFM</b>	Cubic Feet per Minute – gas flow rate.
<b>Clean Air</b>	Plenum Section of a bag-house directly above the Tubesheet and filter bags or cartridges.
<b>Dew Point</b>	The temperature at which water vapor in a gas will condense into a liquid state.
<b>Filter Cake</b>	The accumulation of dust on a filter element before cleaning. This cake assists in the filtration of dust.
<b>Filter Element</b>	Refers to a filter bag or cartridge.
<b>Header</b>	The pressurized reservoir that contains the compressed air supply for pulsing.
<b>Inch of Water</b>	A unit of pressure equal to the pressure exerted by a column of water one inch in height at a standard temperature. 2.77 in. wg. = 1psi.
<b>Interstitial Velocity</b>	The apparent velocity of a gas as it passes through the filter element matrix. It is found by dividing the gas flow rate (CFM) by the cross sectional area of the filter housing less the area occupied by the filter elements.
<b>Pressure Drop</b>	The resistance of flow of a fluid between two points.
<b>Pulse Duration</b>	The length of time a cleaning pulse lasts.



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<b>Pulse Frequency</b>	The time between pulses in a bag-house cleaning system.
<b>Pulse Jet</b>	Generic name given to all pulsing dust collectors.
<b>Purge Pipe</b>	Pipe with holes in it that extends In to a filter clean air plenum and delivers cleaning air from the header to the filter elements.
<b>Re-entrainment</b>	The phenomenon whereby dust is collected from the air stream and then is returned to the air stream. Occurs when pulsed from a filter element and then caught by an upward moving air stream.
<b>Seeding</b>	The application of a relatively coarse, dry dust to a filter element before start-up to provide an initial filter cake for immediate high efficiency and to protect filter elements from blinding.
<b>Tubesheet</b>	The steel plate from which the filter elements are suspended. Separates the clean air and dirty sections of the bag-house.
<b>Venturi</b>	Device used to increase the efficiency of a compressed air pulse.



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## The Filtration Process

Filtration is a dry method of particulate collection in which an array of many individual targets is assembled into a porous structure through which aerosol-laden gas is passed. In a filter, the collection target is the filter media. Inertial, diffusional, electrostatic, and direct interception are the primary forces that influence the collection of dry particulate on the filter media. As collection proceeds, particles impinge upon previously collected particles and a deposit is built up which in turn becomes the principal collection medium. This agglomeration of particles is referred to as a “filter cake”. Filtration efficiency is not maximized until this filter cake has formed.

As the dust cake builds on the filter element surface, it becomes increasingly difficult for the gas to pass through the element. A differential pressure gauge mounted on the filter measures the force required to move air through the filter media. Normal pressure drop for a filter will fall in the range of 1 to 5 inches of water after the elements are broken in. The differential pressure reading will increase as the elements get dirty. The dust cake must eventually be removed from the filter element surface or airflow will fall to unacceptable levels.

Pulse jet filters are continuous self-cleaning units. A high-pressure blast of clean, dry compressed air is injected into each filter element at periodic intervals. This air is stored in a reservoir called a header. Several purge pipes are attached to the header and extend into the clean air plenum above rows of filter bags or cartridges. Holes are drilled in the purge pipes directly above each of the filter elements. Several elements are cleaned by one purge pipe. A solid state timer controls a solenoid that opens a diaphragm valve allowing air to flow from the reservoir into the purge pipe and filter element. The element experiences a shock wave while air is forced through it in a direction opposite to the dirty air flow. A portion of the dust cake will fall away from the bag into the filter’s hopper. It is normal for some of the dust to re-entrain itself onto the filter element.

### High Temperature Precautions

Moisture is one of the most predominant causes for fabric filter failures. Care must be taken in applications involving high humidity gas streams. Dryers and other combustion processes pose the greatest danger for condensation in the filter. The filters and gas stream temperatures must be maintained at 50°F above the dew point of the gas stream. Excursions near or below the dew point of the gas stream will result in condensation of the gas on the bag-house and filter media. This moisture will change the desired dust cake into an undesirable mud cake, which is difficult to remove and may permanently damage the filter media. Corrosion is also intensified under these conditions. Filters operating under high humidity conditions at any temperature should be protected from gas condensation. This will require heating the filter to 50°F above the gas stream temperature and insulation of the filter and ducting. Failure to take these precautions will result in unsatisfactory performance of the equipment and possible catastrophic failure of the filter media.



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## **Mechanical Operation**

VAYUVENTS PRIVATE LIMITED Pulse Jet Filters are available with continuous or "on demand" cleaning control. Cleaning duration and frequency are adjustable on the timer board. Dwyer Photohelic® pressure switches can be used to control the cleaning cycle, which will conserve energy, reduce element wear, and lower emissions by maintaining a set pressure drop across the filter elements. Filter bags are made from felted fibers and are supported on a rigid wire cage. Filter cartridges are made from pleated filter media and supported on skeletal frames. The composition of the fiber will vary depending on the dust and gas chemistry, temperature, and gas stream humidity.

Filter elements are suspended in the filter from the Tubesheet in one of the following configuration:

### **Top access filter with bag and cage elements**

A filter bag is inserted into the Tubesheet and held in place with a snap band. A wire cage is then inserted into the bag for support. The cage collar rests on top of the Tubesheet.

### **Bottom access filter with bag and cage elements**

A wire cage is slipped into each bag for support. This bag and cage assembly is attached to bag cups on the underside of the Tubesheet with a clamp.

### **Top access filter with cartridge elements**

Cartridges are self supporting. The cartridge is inserted through the top face of the Tubesheet. A flexible tab at the top of the cartridge snaps through the Tubesheet, locking the cartridge into place.

### **Bottom access filter with cartridge elements**

Cartridges are self supporting. The cartridge is equipped with a flexible collar that slips over the bag cup on the bottom side of the Tubesheet. The cartridge is then secured with a clamp.

Dust is collected on the surface of the filter media and eventually forms a cake. When a pulse of compressed air is injected into the filter element, a shock wave is induced that causes the dust cake to break away. Some of this air will pass through the filter media in a reverse direction and further separate the dust cake from it. The name "Reverse Pulse Jet" is derived from this cleaning method. Separated dust falls into the hopper where it is removed through an airlock or other airtight device. The airlock prevents air from entering the hopper through its discharge. Leakage at the hopper's discharge will cause re-entrainment of dust onto the filter elements, which could contribute to high differential pressures.

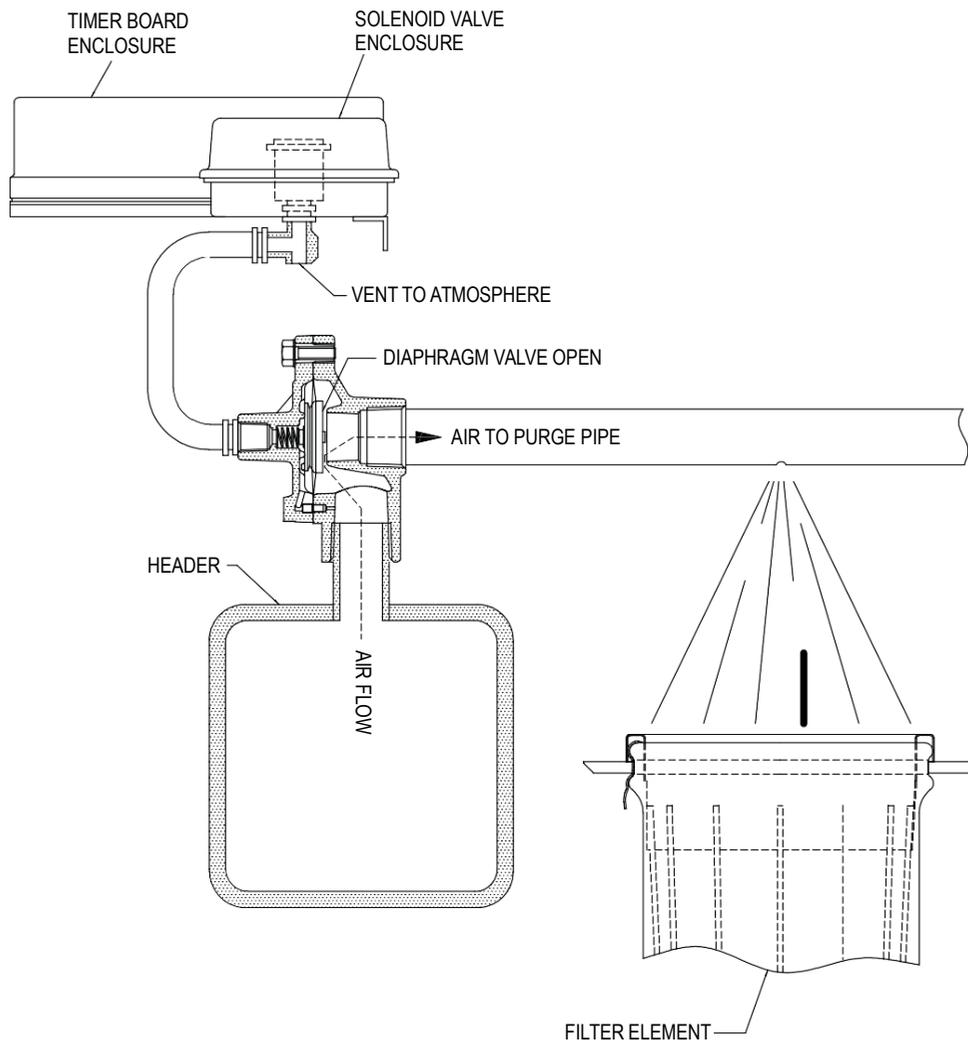
The solid state programmable timer is available with 3 to 32 output connections. A potentiometer is provided for the adjustment of the pulse duration and frequency. Duration of the pulse is factory set at 50 milliseconds. Frequency of the pulse is factory set at 10 to 15 seconds.



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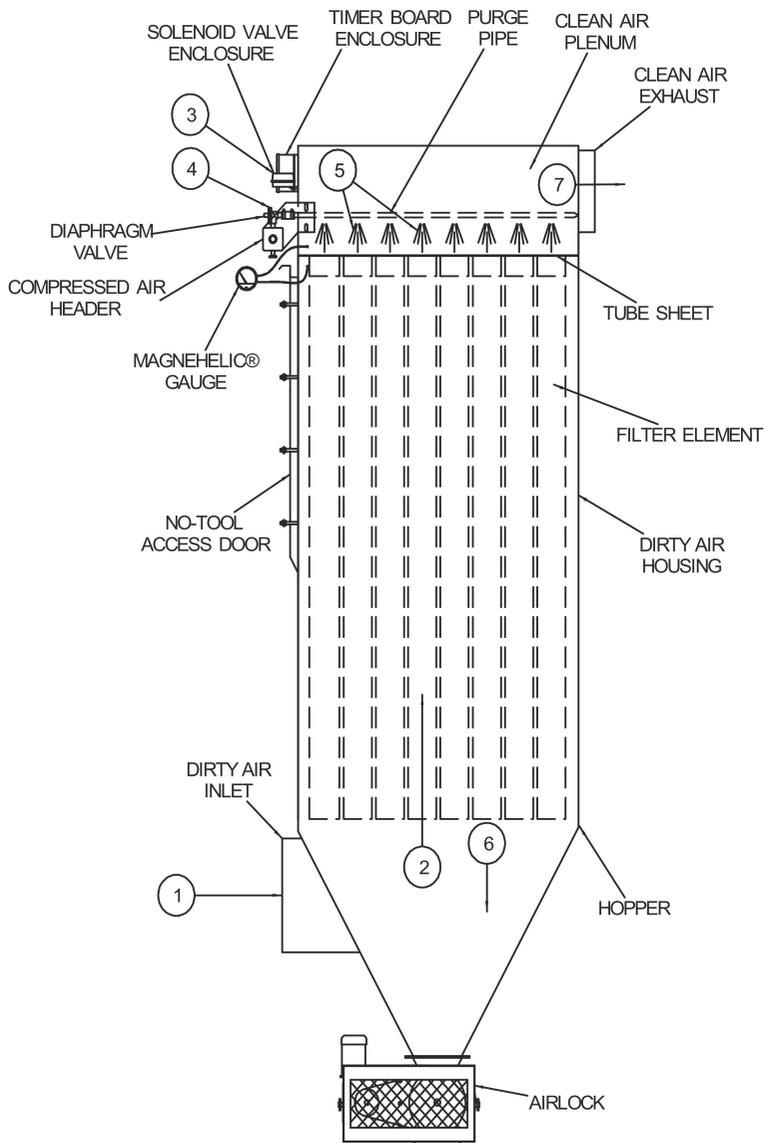
## Solenoid and Diaphragm Valve

Cleaning air passes from the header through a large diaphragm valve, through the purge pipe, then into the filter element. This diaphragm valve is controlled by the timer board with a normally closed solenoid valve (see illustration below).



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## Pulse Jet Theory of Operation (BAG AND CAGE PULSE JET FILTER)

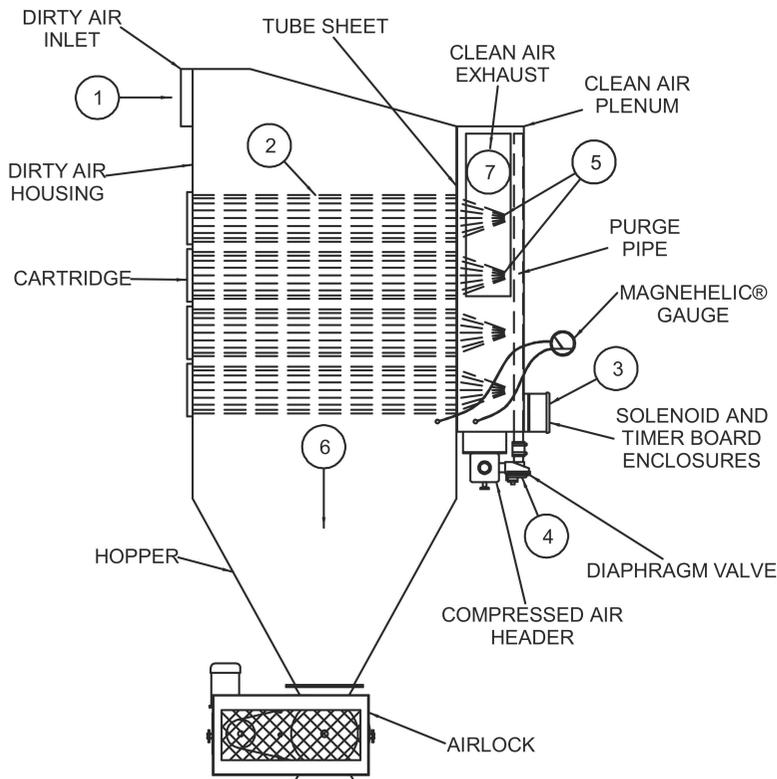


### SEQUENCE OF OPERATION

- ① Dust laden air or gas enters the dust collector through the inlet.
- ② Air passes through the filter media while solids are retained on the media's surface.
- ③ A signal from the timer actuates the opening of the normally closed solenoid valve.
- ④ Opening of the solenoid valve releases the air pressure in the tube connecting the solenoid to the diaphragm valve, causing the valve to open.
- ⑤ A momentary pulse of compressed air flows from the air header down the purge pipe and out into each filter bag. This momentary pulse takes all bags in one row off line through pressure reversal.
- ⑥ Solids are released to fall into the filter hopper or bin.
- ⑦ Filtered air exits through the clean air plenum exhaust.

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## E-86 Theory of Operation (CARTRIDGE PULSE JET FILTER)



### SEQUENCE OF OPERATION

- ① Dust laden air or gas enters the dust collector through the inlet.
- ② Air passes through the filter media while solids are retained on the media's surface.
- ③ A signal from the timer actuates the opening of the normally close solenoid valve.
- ④ Opening of the solenoid valve releases the air pressure in the tube connecting the solenoid to the diaphragm valve causing the valve to open.
- ⑤ A momentary pulse of compressed air flows from the air header down the purge pipe and out into each filter cartridge. This momentary pulse takes all cartridges in one row off line through pressure reversal.
- ⑥ Solids are released to fall into the filter hopper or bin.
- ⑦ Filtered air exits through the clean air plenum exhaust.



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## Filter Media Properties

Filter media is manufactured from various materials, which provide different beneficial characteristics. Below is a Fabric Selection chart, which summarizes some of the properties of common fabric materials.

MATERIAL	ACID RESISTANCE	ALKALI RESISTANCE	SOLVENT RESISTANCE	STRENGTH & ABRASION	FLAME RESISTANCE	FILTRATION PROPERTIES	RELATIVE COST	OPERATING TEMP °F
Polypropylene	E	E	E	E	P	G	1	180
Acrylic	G	F	G	G	P	G	2	260
Polyester	G	G	G	F	G	F	1	275
Ryton	E	E	E	G	F	V	6	375
Nomex	F	G	V	G	F	E	4	425
Teflon	E	E	E	G	F	F	8	450
Fiberglass	E	F	E	P	F	F	3	500
P-84	V	F	V	G	F	E	5	500

P = Poor, F = Fair, G = Good, V = Very good, E = Excellent

### Polypropylene

This synthetic is available in both continuous filament and staple fiber form and is produced as either a felt or woven material. Its major limitation is its low maximum continuous operating temperature of 180°F (88°C). Oxidizing agents, copper, and related salts damage polypropylene. Its primary benefit is that it is non-hygroscopic (does not chemically react with water). It exhibits great resistance to static build-up and abrasion, and provides a slick surface for good dust cake release during bag cleaning. Polypropylene is widely used in the food, detergent, chemical processing, pharmaceutical, and tobacco industries.

### Acrylic

These synthetic fibers offer good hydrolytic resistance over a limited temperature range, 260°F (127°C) continuous, 275°F (135°C) surge. The homopolymer versions, such as Draylon T® produced by Farbenfabriken Bayer AG, are normally recommended. Acrylic fibers are used in the manufacture of ferrous and nonferrous metals, carbon black, cement, lime, fertilizers, and following spray-dryers in coal-fired burners. They are also used extensively in wet-filtration applications.

### Polyester

Today, polyesters are among the most widely used fabrics for general applications below 275°F (135°C), their



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maximum continuous-use temperature. Their maximum surge temperature is about 300°F (149°C). Polyester fibers are produced in both filament and staple form and are available in both woven and felted fabrics. The primary damaging agents are water (hydrolysis) and concentrated sulfuric, nitric, and carbolic acids. They have good resistance to weak alkalis and fair resistance to strong alkalis at low temperatures. They have good resistance to most oxidizing agents and excellent resistance to most organic solvents.

## **Ryton**

This is a relatively new synthetic fiber with a moderate temperature range, 375°F (190°C) continuous, 450°F, (232°C) surge. It will hydrolyze, but only at temperatures above 375°F. It has excellent resistance to both acids and alkalis, which makes it very useful in combustion-control applications. Its early applications have been on industrial coal-fired boilers, waste-to-energy incineration (with and without spray dryers), titanium dioxide, and installations where Nomex does not perform well due to chemical or hydrolytic attack.

## **Nomex**

This is a commonly used fiber for applications in the 275-400°F (135-204°C) range. It is produced in both filament and staple fiber form and is available as both woven and felted fabrics. It has excellent thermal stability, shrinking less than 1% at 350°F (177°C). The fiber is flame resistant, but when impregnated with combustible dusts, will support combustion that will melt and destroy the fabric. Nomex will begin to hydrolyze at 375°F (190°C) when the relative humidity is 10% or greater. Hydrolysis changes the normal white or gray fabric to a red-brown color. The presence of acids will catalyze the hydrolysis process. Unacceptably short bag life will result where sulfur oxides (SO<sub>x</sub>) and moisture are present and frequent dew point excursions occur, such as in coal-fired boilers. Some acid-retardant finishes have been developed for Nomex, but have been found to improve bag life by no more than 50%, leaving most bag life cycles unacceptably short.

## **Teflon® (PTFE)**

Teflon® is unique among synthetics in its ability to resist chemical attack across the entire pH range throughout its operating temperature range of 450°F (232°C) continuous, to 500°F (260°C) surge. This fluorocarbon fiber is non-adhesive, has zero moisture absorption, and is unaffected by mildew or ultraviolet light. The primary shortcomings of Teflon® are its high cost and relatively poor abrasion resistance. However, the higher cost can often be justified through longer bag life in extremely corrosive atmospheres. Felted Teflon® is also produced in combination with staple glass fibers and marketed by DuPont as Tefaire®. This combination produces some improved filtration and flow characteristics. Applications of Teflon® include coal-fired boilers, waste-to-energy incinerators, carbon black, titanium dioxide, primary and secondary smelting operations, and chemical processing.

## **Fiberglass**

Most fiberglass fabrics are woven from minute 0.00015 inch (.0038 mm) filaments. Many variations of yarn construction, fabric weaves, and fabric finishes are available. It is also produced in a felted form. Fiberglass has the highest operating temperature range available in conventional fabrics:

500°F (260°C) continuous, 550°F (288°C) surge. Above 500°F (260°C), the fiberglass itself is not directly damaged, but the finish which provides yarn-to-yarn lubrication begins to vaporize, resulting in accelerated mechanical wear of the glass fibers. Fiberglass is noncombustible, has zero moisture absorption (cannot hydrolyze), has



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excellent dimensional stability, and has reasonably good strength characteristics. Woven glass fabrics have high tensile strength characteristics but relatively low flex strength, especially in the fill (circumference) direction of the bag, and low abrasion resistance. Care must be taken to minimize flexing and rubbing. Fiberglass fabrics have relatively good resistance to acids, but impurities in the glass fibers are attacked by hydrofluoric, concentrated sulfuric, and hot phosphoric acids. They also have poor resistance to hot solutions of weak alkalies, acid anhydrides, and metallic oxides. For these reasons, glass fabrics should not be operated below the acid dew point. Fiberglass fabrics are used extensively with coal-fired boilers and high temperature metals applications.

## **P-84**

P-84 is an aromatic polymer fiber produced in felt form only. The unique shape of the fiber produces improved capture efficiency characteristics. This fabric is specified at 500°F. Composites are available that take advantage of the superior filtration characteristics of P-84 while reducing its cost. Any of the previous felted materials can be combined with P-84 to produce a fabric composite that exhibits the characteristics of both materials.

## **Media Treatments**

### **Surface Treatment of Filtration Media**

Various types of surface treatment are available to enhance the filter media performance. Discussion of these treatments and their benefits are beyond the scope of this manual.

### **Pre-coating Filter Media**

Fine, moist, or adhesive dusts will contribute to premature blinding of filter media. Pre-coating of the filter media with a layer of an inert dust of known particle size distribution, such as calcium carbonate ( $\text{CaCO}_3$ ), can minimize problems associated with these types of dusts.



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## Installation

### Filter

VAYUVENTS PRIVATE LIMITED pulse jet filters, depending on size, will be shipped either as complete units or in sections. All units require the installation of the filter elements along with connections to 110 VAC and compressed air. Larger filters are shipped in major sub assemblies that are bolted together at the job site and set on the foundation. Refer to the general arrangement drawing for details on the number of sub-assemblies and the extent of assembly required for your unit.

### Compressed Air

AIRPRO INDUSTRIES INDIA pulse jet filters having bags and cages require 90-100 psi clean (5 micron filter), dry (dew point  $-40^{\circ}\text{F}$ ), compressed air. Cartridge filters require 60 psi max. This supply is connected to the filter header. The general arrangement drawing will note the location and pipe size for the compressed air feed.

### Lubrication

There are no lubrication requirements on a pulse jet filter. However, discharge devices such as a rotary airlock will require lubrication. Refer to the specific manuals for lubrication of this equipment.

### Top Access Bag and Cage Installation



#### Step 1

Lower the bottom of the bag through the hole in the tubesheet.

#### Step 2

Fold the snap band (bag top) to insert it into the tubesheet hole.

#### Step 3

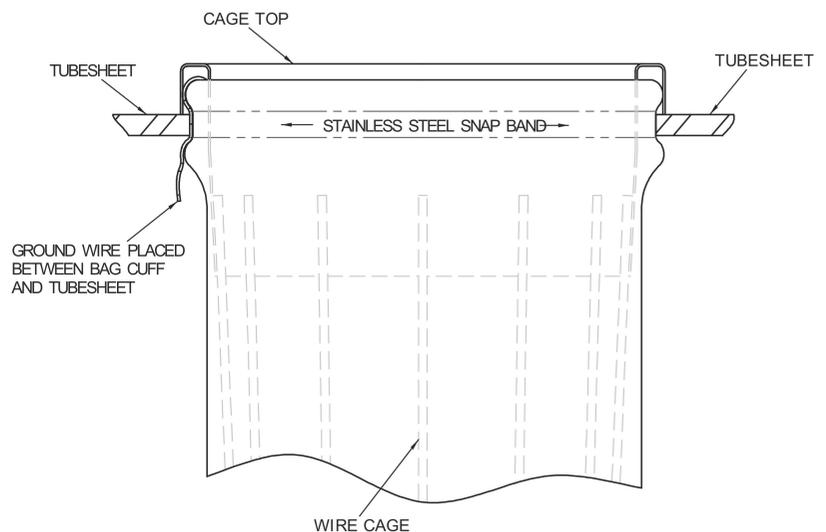
Fit the groove of the snap band to the edge of the tubesheet and allow the band to snap into place.

#### Step 4

Check the fit of the snap band. It should fit securely all around with no wrinkles in the snap band. The top of the bag should be above the tubesheet approximately  $3/8$ ".

#### Step 5

Slide the cage into the bag until it rests on the tubesheet.





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## Optional Grounding Strip

If the bags are equipped with a grounding strip, fold the wire over the top of the bag and down its side prior to fitting in the Tubesheet. The wire should be between the bag cuff and the Tubesheet as shown in the illustration.

## Bottom Access Cartridge Installation

### Step 1

Before entering the filter, slide the clamp band over the rubber collar at the top end of the cartridge.

### Step 2

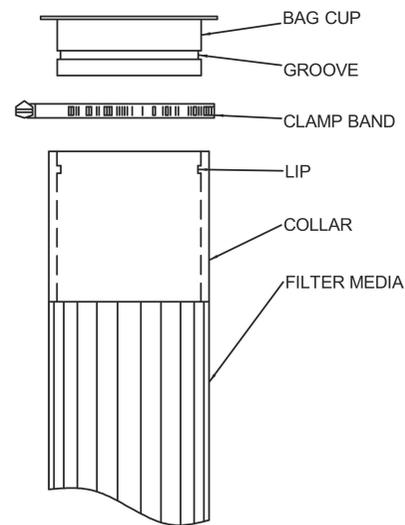
Enter the filter and fit the cartridge collar over the bag cup.

### Step 3

Move the cartridge up and down over the bag cup until the raised lip inside the cartridge collar snaps into the groove in the bag cup.

### Step 4

Tighten clamp until cartridge cannot be turned by hand.



## Bottom Access Bag and Cage Installation

### Step 1

Before entering filter housing, slide cage into bag. Align seam in bag with split in cage collar.

### Step 2

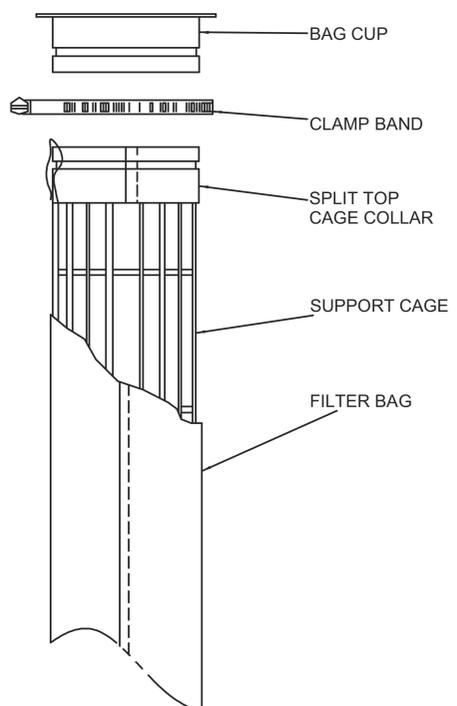
Fold top 3" of bag and ground strip (if supplied) into cage.

### Step 3

Slide clamp band over bag and cage, aligning it above the cage collar ridge.

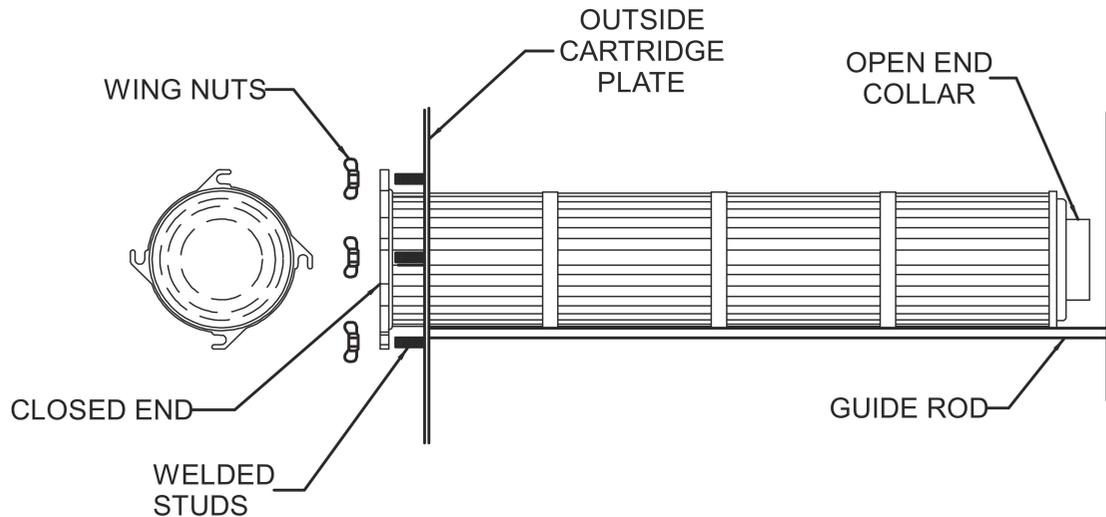
### Step 4

Enter filter housing with bag, cage, and clamp band assembly. Slide the cage collar over the bag cup until locking ridges are engaged. Position clamp screw 90° from bag seam. Tighten clamp band until bag and cage assembly cannot be turned by hand.





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Check the sealing gaskets on the cartridge before installation. They should be secure on both ends. Loose gaskets may be re-attached with silicone caulk. Minor damage may be repaired with silicone caulk. Major damage will require replacement of the gasket.

Insert the cartridge into the cartridge plate hole. Avoid contact between pleated media and edges, as this could damage the media. Align the flange holes with the studs in the cartridge plate. Tighten the wing nuts by hand until the flange touches the cartridge plate, fully compressing the gasket. Do not use tools.



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## INSTALLATION INSTRUCTIONS

### WARNING

- Read these instructions carefully and completely before attempting to unpack, install or service the explosion vent.
- Handle the explosion vent with extreme care. DO NOT bend, poke, or in any way distort the explosion Vent.
- Do not locate vent assembly where personnel are exposed to the vent or the area above or in front of the vent, as they may be injured by the release of pressure, flame, noise, particles, and/or process material.
- Locate the explosion vent so that the discharge does not ignite other combustibles, resulting in an ensuing fire or secondary explosion.
- Interfacing equipment and/or machinery must also be Protected.
- Flow arrows on round explosion vent tags, or explosion vent tag for square and rectangular vents must be directed to the atmospheric side of the process.
- Provisions shall be made to prevent personnel from standing or walking on vents, as they risk falling through.
- The vent opening is to be left free and clear. Nothing, i.e. goods or products, is allowed to obstruct the vent area as this will decrease vent efficiency.
- Install the enclosed DANGER sign in a conspicuous location near the zone of potential danger.



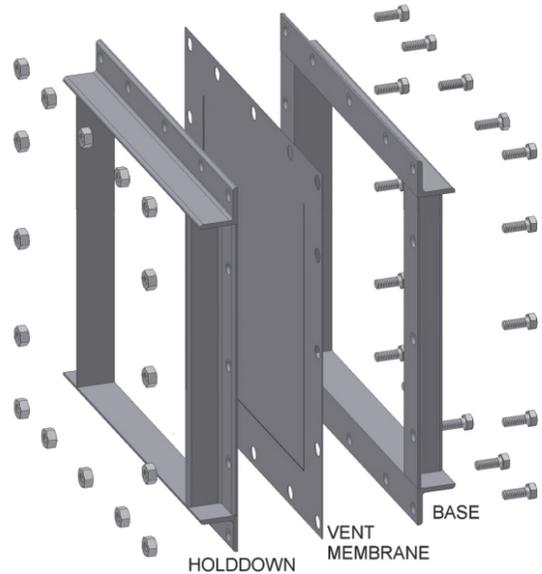
### GENERAL

An explosion vent is a pressure relief device, designed to give an instantaneous opening at a predetermined pressure. Its purpose is to protect the equipment from excessive pressures caused by dust or gas deflagrations.

### INSPECTION/PREPARATION

**WARNING: Always handle the explosion vent with extreme caution. Handle the explosion vent by its edges only. Damage to the functional area (center) or seat area of the explosion vent may adversely affect the performance of the explosion vent. Read the explosion vent tag completely before installing to confirm that the size and type are correct for your system.**

1. Carefully remove the explosion vent from its packaging container.
2. Inspect the explosion vent for damage.
3. If foreign material is present, carefully clean the explosion vent with a solvent that is compatible with your media.



4. Two personnel are recommended for handling of all vents larger than 24" x 30" (600 x 1000 mm) (rectangular) and 30" (800 mm) (round) or larger.
5. CV-SF vents require vent frames with back-up bars to properly function (consult Fike for design requirements).

### INSTALLATION

**WARNING:** The vent opening should be left free and clear. Do not insulate any part of the explosion vent or frame without consulting Fike.

**Important:** When explosion vents are installed horizontally, the use of drainage/weep holes in the hold down frame is required.

1. Use base/inlet of explosion vent frame as a template to indicate placement of explosion vent on the vessel or duct to be protected.
2. Cut the vessel or duct opening to the marked size. The marked size should match the size identified on the vent tag.
3. Weld or bolt the inlet angle frame to the vessel or duct.

**Important:** The explosion vent frame must be installed such that the seat area is flat and bolt holes remain perpendicular (square and rectangular vent frames) or circular (round vent frames).



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4. If sealing is a particular concern due to the nature of the process, apply a process compatible silicone sealant or gasket to provide seal between explosion vent and inlet frame.
5. If using a gasket, select a gasket material that is compatible with the process, with a suggested thickness of 1/16" (1.5 mm) maximum. The gasket is to have the same inside diameter and outside diameter as the explosion vent frame.
6. Install the explosion vent and outlet flange aligning the bolt holes. DO NOT force the explosion vent hole alignment.
7. Apply light oil to the threads and install the nuts and bolts hand tight.
8. Torque each bolt to the value identified on the explosion vent tag.

**Caution:** The torque values should not be exceeded as this may cause failure of the bolt and/or damage to the vent.

## BURST INDICATOR

The explosion vents can have as an option an integrated electric burst indicator designed for intrinsically safe service. Refer to Burst Indicator Instructions / Drawing for electrical and dimensional specification.

**Caution:** Unacceptably high voltage or currents will permanently damage the electrical system and the use of a non approved intrinsically safe power supply may even be the eventual ignition source of a dust or gas explosion. All burst indicators must be installed in an intrinsically safe circuit which conforms to the applicable national standard.

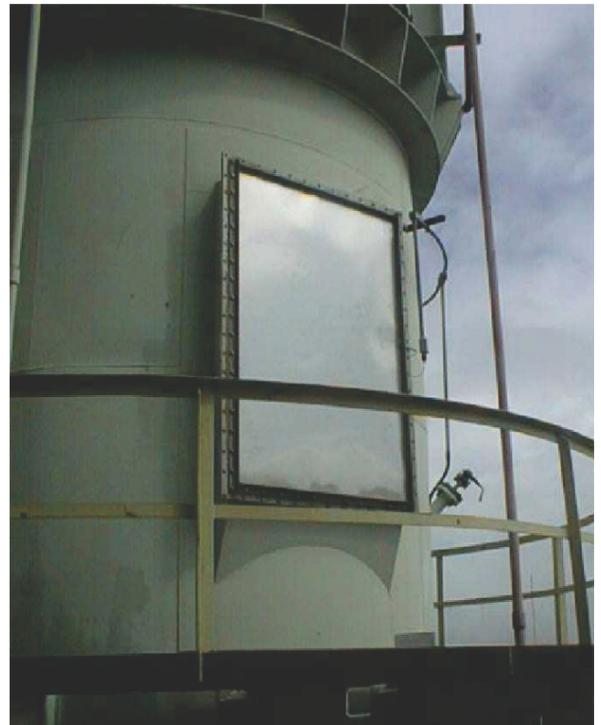
**WARNING:** Do not bend the electrical cable at any angle at a distance of less than 8 inch (20cm) from the mechanical bracing part and do not lift the explosion vent by the electrical cable, as this may damage the electrical circuit.

**WARNING:** The maximum torque values as mentioned on the nameplate must not be exceeded as this will permanently damage the electrical circuit.

## MAINTENANCE

The explosion vent is maintenance-free due to its basic design and concept. Periodic visual inspections should be performed in accordance to the operating parameters and severity of service. All operational system parameters should be observed as a standard maintenance practice. The explosion vent must be replaced if they appear damaged, corroded, or leaking.

**Note:** Severe service is defined as rapid changes in pressure, high pressure, high temperature, or corrosive process.





# VAYUVENTS PRIVATE LIMITED

## Operation

Proper start-up and shutdown procedures are very important in the successful operation of a bag house filter. A typical ambient air dust collection system should follow this sequence of operation.

1. Start the dust removal system that transfers collected material from the filter hopper. This could include rotary airlocks, pneumatic conveying equipment, etc. This step is not applicable for Style II bin vent filters.
2. Start the bag house cleaning mechanism. Before starting additional equipment, let the cleaning mechanism run long enough to allow the filter temperature and humidity to stabilize with ambient conditions and to remove any material that may have been left from the previous day's operation. This is most important in high humidity climates.
3. Start the main system fan.
4. Start the operation or process where dust is being collected.

Reverse the order of the above sequence to shut down the bag house.

1. Shut down the operation or process where dust is being collected.
2. Shut down the main system fan.
3. Shut down the bag house cleaning mechanism after allowing the collected material to be discharged from the collector.
4. Shut down the dust removal system that transfers material from the filter hopper (not applicable for Style II bin vent filters).



# VAYUVENTS PRIVATE LIMITED

## Maintenance

Very little maintenance is required to achieve maximum efficiency and life from your VAYUVENTS PRIVATE LIMITED pulse jet filter. The following items should be periodically serviced.

### Lubrication

Pulse jet filters have no lubrication requirements.

### Timer Adjustments

Do not change the timer adjustments until the filter has had several weeks to stabilize. This break-in period is required for the filter media to develop stable dust cake. After the break-in period, the pulse interval can be increased in order to conserve energy and compressed air. Increase the pulse interval by adjusting the potentiometer clearly marked on the timer board. Adjust in 5 second increments allowing 24 hrs of operation between adjustments. Observe the differential pressure of the unit after 24 hrs. The pulse interval can be extended until an increase in differential pressure is observed in the filter. **Do not change the pulse duration. It should be 40 to 50 milliseconds for best results.**

### Cleaning and Repair

The external portion of this unit should be treated as any other metal surface that is subject to corrosion. Periodic cleaning and painting when required argon leak broken filter element. Remove accumulated dust from clean air plenum and replace filter element immediately. Dust in the clean air side of a filter element will reduce the life and performance of the element.

### Solenoid and Diaphragm Valves

The solenoid and diaphragm valves may require periodic maintenance depending on the quality of the compressed air supplied to the unit.

### Filter Elements

Filter elements do not require any periodic maintenance. However, at some point the elements will require replacement. This will be indicated by persistent high differential pressure across the elements. Many factors affect the life of filter elements. Refer to the section on troubleshooting if low element life or persistent wear problems are evident.

### Rotary Valve (Airlock)

Refer to airlock operation and maintenance manual.

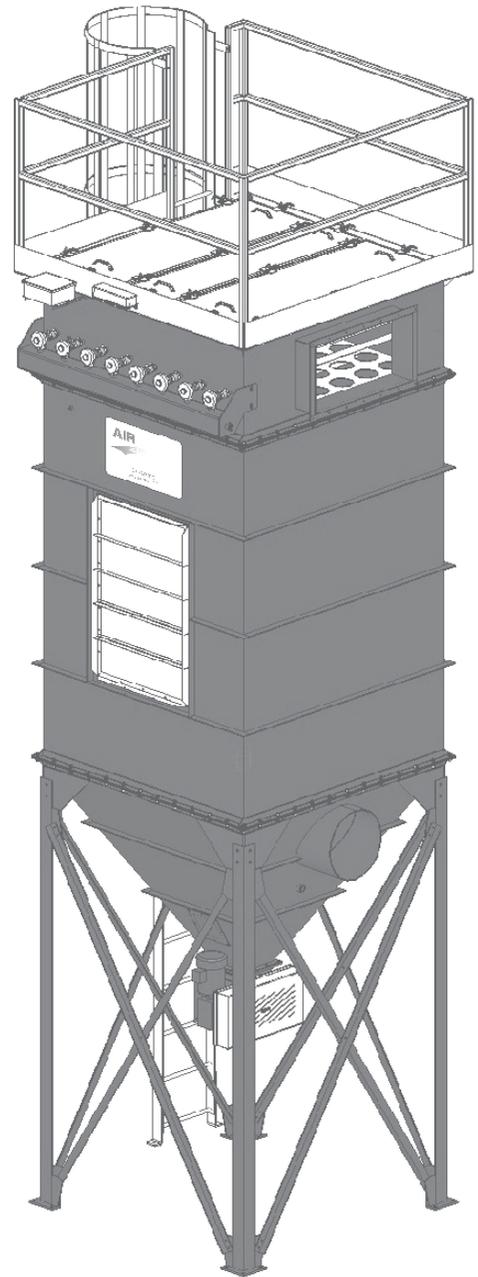


# VAYUVENTS PRIVATE LIMITED

## Troubleshooting Pulse Jet Filters

The pulse jet is a continuous self-cleaning filter. A jet of high-pressure air from a compressed air header is directed into each bag at periodic intervals. Air is distributed to each row of filter bags through a diaphragm valve and blow tube equipped with drilled nozzles. The high-pressure reverse flow of air momentarily stops the normal flow and creates a shock wave that knocks the dust from each bag. A percentage of the dust cake will fall away from the bag into the filter hopper. It is normal for some of the dust to re-entrain on to the bag.

Troubleshooting the pulse jet is a straight forward process, but does require some preliminary information to simplify the process.





# VAYUVENTS PRIVATE LIMITED

## Pulse Jet Troubleshooting Worksheet

Customer Name \_\_\_\_\_

Location \_\_\_\_\_

Contact Name \_\_\_\_\_

Phone \_\_\_\_\_ Cell Phone \_\_\_\_\_ Fax \_\_\_\_\_

Email Address \_\_\_\_\_

Filter Model \_\_\_\_\_ Serial # \_\_\_\_\_

How long has the filter been in service? \_\_\_\_\_

When did the problem start? \_\_\_\_\_

Please provide a complete description of the problem and a detailed description of the system layout.  
\_\_\_\_\_  
\_\_\_\_\_

Are the airlock and discharge auger operating, and in the correct rotation?

Airlock Model # \_\_\_\_\_ Airlock Serial # \_\_\_\_\_

Is the timer board energized? \_\_\_\_\_

Control Voltage    110V     220V     24VDC     Other \_\_\_\_\_

Does the filter have an adequate supply of compressed air, and is it turned on?

Is the compressed air supply regulated to 90-100 PSIG for bags or to 60 PSIG for cartridges?

Are any bags, cartridges, and/or blank-out plugs missing?

Check the tubing between the solenoid valves and diaphragm valves for cracks or splits.



# VAYUVENTS PRIVATE LIMITED

## **Problem: High differential pressure across Tubesheet (Possible causes with solutions)**

### **Bad Gauge**

Check the gauge by blowing into it. Do not use compressed air that could damage the gauge. Replace the gauge if the needle does not move.

### **Leaking Gauge Lines**

Check the full length of both lines for cracks, splits or breaks. Replace both lines with new tubing. Copper tubing may be recommended if the environment is harsh. Clogged gauge lines will give the same result. Check the small filter, located on the inside of the bag-house just below the Tubesheet. Clean or replace it as required.

### **Low Header Pressure**

Pulse jet filters require 90 – 100 PSIG for bags and 60 PSIG for cartridges. Ensure that the pipe to the filter is of adequate diameter for the length of the run. Check for leaks in the supply line and other equipment. Check the filter diaphragm and solenoid valves for correct operation. A ruptured diaphragm valve or a stuck solenoid valve will drain a compressor. A cracked or broken line from the solenoid valve to the diaphragm valve will have the same effect.

### **Timer board malfunction**

Most timers in use today are solid state. They either work or they do not. Timers are equipped with a slow blow fuse to protect from power surges. If a timer does not function, replace the fuse. Replace the timer board if fuse replacement doesn't correct the problem.

### **Timer board adjustments**

The filter cleaning pulse will be at equal and regular intervals when the timer board is operating correctly. Pulse frequency (the time between cleaning pulses) is factory set at 15 seconds. It may be adjusted to optimize cleaning efficiency and compressed air use. Allow 24 hours of operation between adjustments to permit the filter to stabilize. Over cleaning will reduce filter element life expectancy and use excessive compressed air. Pulse duration (length of cleaning pulse) is factory set at 40 to 50 milliseconds. Typically, this setting should be maintained for best cleaning and air use.

### **Media Blinding**

Excessive moisture is the most common cause of blinding. High humidity, condensation, and leaks in the duct are typical sources. In high humidity areas, the filter should be operated under no load until air temperatures stabilize. The air stream temperature crossing the dew point, either from ambient high humidity or from process moisture, causes condensation. It may be necessary to pre-heat and insulate the filter to avoid dew point issues. Duct leaks are found by inspection and routine preventive maintenance.

### **Interstitial or "Can" Velocity too high**

Check the system airflow with the original design values. The fan speed may have been increased, duct layout may have been modified, or other changes made in the system may have reduced static pressure. Any increase in CFM will increase interstitial velocity and tend to "float" dust in the filter. A change in the process could result in smaller particle sizes in the dust, which would have the same effect as increased CFM. In either case, it may be necessary to install a larger filter or reduce airflow to the original design.

### **Bag Fit on Cages**

Check the bag fit on cages with a pinch test. You should be able to pinch at least ½" of fabric at any position. Bags that are too tight will not allow the bag to "pop", knocking the dust cake loose when cleaned. Replace the bags if they are too tight.



# VAYUVENTS PRIVATE LIMITED

## **Rotary Valve (Airlock) Leakage**

Air leakage through a worn out valve rotor into the filter hopper will re-entrain dust onto the filter bags. Air leakage will also keep the collected dust from properly feeding out of the hopper, potentially plugging the filter. Replace the airlock.

## **High Dust Load**

Filters can handle very high dust loads under normal conditions when properly sized. Has something changed in the process, to either increase material flow or to decrease particle size? Compare current operating conditions to the original design. It may be necessary to install a larger filter or reduce airflow to the original design.

## **Problem: Low differential pressure across the Tubesheet**

### **Bad Gauge**

Check the gauge by blowing into it. Do not use compressed air that could damage the gauge. Replace the gauge if the needle does not move.

### **Leaking Gauge Lines**

Check the full length of both lines for cracks, splits or breaks. Replace both lines with new tubing. Copper tubing may be recommended if the environment is harsh. Clogged gauge lines will give the same result. Check the small filter in the line. It is located on the inside of the bag-house just below the Tubesheet. Clean or replace it as required.

### **Holes in Bags**

Replace all bags. See section on poor bag life.

### **System Air Volume too low**

Check the duct system for plugs and closed blast gates. Check the main system fan for correct RPM or a closed damper.

### **Bag & Cage Installation**

Look for dust in the clean air plenum or discharging from the system fan. Bags may be missing or may not be properly installed in the Tubesheet. Refer to the instruction manual for correct installation.

### **Blank-Out Plugs**

Plugs may be missing or improperly installed. Refer to the instruction manual for correct installation.

### **Problem: Dust in exhaust air**

### **Start Up Period**

Allow the filter to run for 48 to 96 hours to establish a dust cake. Some applications will require "seeding" or pre-coating the bags with an appropriate material to establish a cake.

### **Holes in Bags**

Replace all bags. See section on poor bag life.

### **Bag & Cage Installation**

Look for dust in the clean air plenum or discharging from the system fan. Bags may be missing or may not be properly installed in the Tubesheet. Refer to the instruction manual for correct installation.

### **Blank-Out Plugs**

Plugs may be missing or improperly installed. Refer to the instruction manual for correct installation.



# VAYUVENTS PRIVATE LIMITED

## **Problem: Poor Bag Life**

### **Abrasion**

Provide an inlet transition to make use of the full inlet area. Stubbing a duct onto a plate on the inlet will result in high velocity. Do not mount a duct elbow directly on the filter inlet, as this will cause eccentric loading and potentially damaging airflows.

### **Damaged Cages**

Filter cages that are bent, have broken wires, or have corrosion will cause premature failure of the filter bags. Inspect and replace as soon as possible. Corrosion problems may require coated or stainless steel cages.

### **High Air Volumes**

High air to cloth ratios can shorten filter bag life. Compare current operating conditions to the original design.

### **Media Blinding**

Excessive moisture is the most common cause of blinding. High humidity, condensation and leaks in the duct are typical sources. In high humidity areas, the filter should be operated under no load until air temperatures stabilize. The air stream temperature crossing the dew point, either from ambient high humidity or from process moisture, causes condensation. It may be necessary to pre-heat and insulate the filter to avoid dew point issues. Duct leaks are found by inspection and routine preventive maintenance.

### **Incorrect Filter Media**

High temperatures, chemical content, and dust composition will affect filter media life.

## **Problem: Hopper Plugging**

### **Cleaning System malfunction**

Refer to the section on High Differential Pressure.

### **Rotary Valve (Airlock) Leakage**

Air leakage through a worn out valve rotor into the filter hopper will re-entrain dust onto the filter bags. Air leakage will also keep the collected dust from properly feeding out of the hopper, potentially plugging the filter. Replace the airlock.

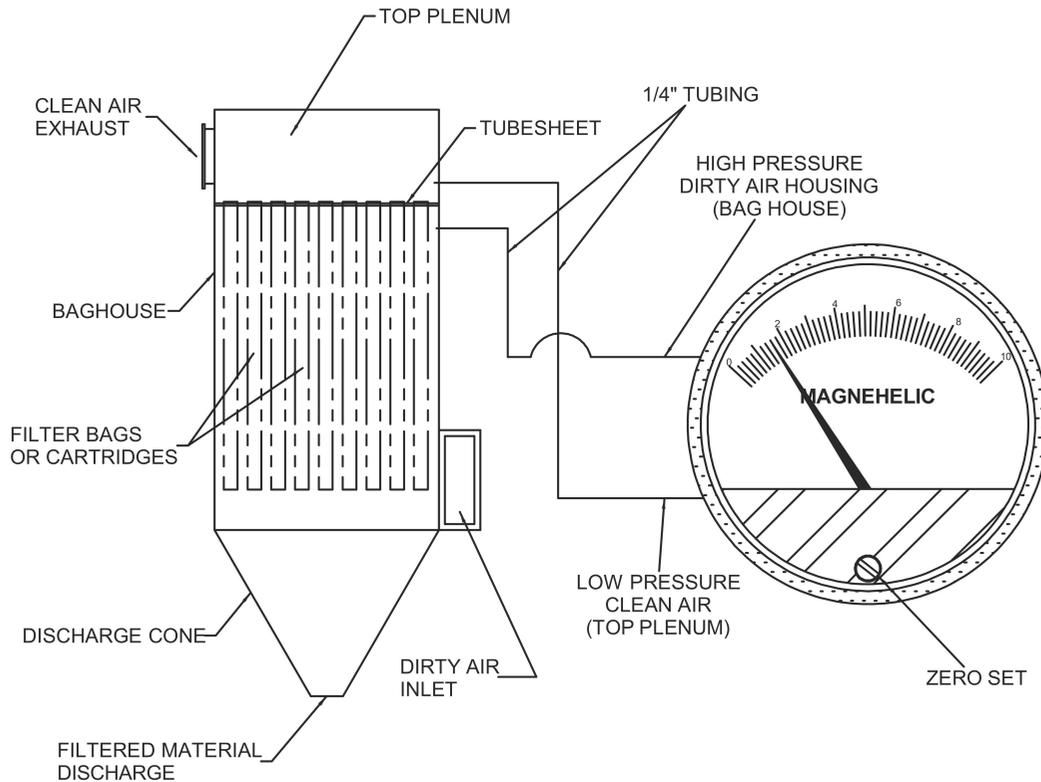
### **Airlock/Auger Speed**

If your filter is equipped with an auger/airlock combination slave drive and operating conditions have changed, the airlock/auger speed may need to be increased.



# VAYUVENTS PRIVATE LIMITED

## Magnehelic Gauge Operation



The Magnehelic® gauge is used to measure the differential pressure between the clean gas side (top plenum) and the dirty gas side of the bag-house. It measures the force required to pass air through the filter media.

Normal pressure drop for a filter will fall in the range of 1 to 5 inches of water after the elements establish a dust cake. The differential pressure reading will increase as the elements get dirty. Eventually, the dust cake must be removed from the filter element surface or air flow will fall to unacceptable levels.



# VAYUVENTS PRIVATE LIMITED



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