Dust Collection System Maintenance Primer

Information for Better Dust Collection System Operation

AirSys Tech Inc.

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With increased local and global attention being given to the control of air pollution, containment of nuisance dust in all industrial applications is becoming increasingly important. This calls for the proper design, installation, operation and maintenance of dust collection equipment. Since its inception, the media style of dust collector has offered companies the ability to effectively capture airborne particulate from an air stream. Whether toxic or not, containment of particulate is necessary to provide a healthy and clean work environment.

In an effort to ensure that your equipment functions as designed, we recommend a schedule of inspections and the timely repair of damaged or malfunctioning equipment.

A routine inspection and maintenance program will positively impact the equipment's performance and life. Following is an overview of procedures that can be used as a guide from which to tailor your own program. Please refer to the equipment manufactures specific maintenance suggestions and add to the items found.

1) Inspection/Maintenance Program: A typical program consists of a schedule for periodic inspections that are performed on a daily, weekly, monthly, semi-annual and annual basis. When a dust collector system is not periodically inspected, the effectiveness of its operation can be adversely affected.

2) Pressure Drop: Pressure drop, or differential pressure, is the amount of static resistance experienced when operating a positive or negative pressure dust collector. This pressure drop is typically measured across the filter bags in inches of water column (in. w.c.). Examples of some standard gauges used for this monitoring are a Magnehelic¨ gauge, Photohelic¨ switch/gauge and manometer. Pressure drop is a good indicator regarding the amount of dust that has collected on the filter media, and if continually monitored and logged, the condition of the bags themselves.

New filter bags have the lowest pressure drop because of the inherent permeability of the media. As the bags develop a dust cake, some particulate embed themselves into the interstices of the filter media, and the pressure drop will increase accordingly. It is the filtering of the airstream through this accumulated dust cake that provides high efficiency collection of fine particulate. In fact, the highest efficiency a dust collector can offer is just before the cleaning mechanism is initiated. However, high differential pressures can cause bleed thru or blinding of the filter media. Therefore, it is suggested not to exceed the manufacturer's recommended operating pressure drop.

Keeping a daily log of a dust collectors differential pressure, *from the time the filter media is new,* will provide the opportunity to diagnose problems that may occur (i.e., an increase in dust emissions, reduced ventilation air at the dust source, shortened bag life, etc.). Following an initial seasoning or conditioning period of filter bags, the pressure drop should stabilize into a consistent operating range relative to the cleaning cycle, application and style of equipment. Therefore, at subsequent bag changes, this operating range can be predicted. Deviation from this historical level will alert an operator to investigate the cause of such an occurrence.

3) Cleaning System: Any method used by the equipment to dislodge accumulated dust cake from the filter media is its cleaning system. This may be reverse air, shaker or pulse clean. Regardless of the style of cleaning, it is imperative that this system function properly at all times. Without an effective cleaning system, dust will continue to build on the bags. The resultant will be an increased pressure drop and reduced volume of ventilation air at the pick-up points. Further, airstream velocities within the ductwork will decrease and cause drop-out of dust in the ducts. This may choke the entire system and render it ineffective.

As indicated on our Inspection Logs, cleaning systems require more than just periodic monitoring. It is suggested that all components of the system be regularly inspected, and corrections made in a timely manner. Besides the items noted on the attached logs, refer to your OEM's Installation & Maintenance Manual to include other items specific to their equipment.

4) Hopper Discharge: The hopper on a dust collector *is not* to be used for storage of the collected product, unless originally designed to do so. Storing material in a hopper can lead to bridging of the dust, or it may set up as a solid mass requiring considerable labor and down time to correct. Material build up, if not discovered in time, can fill a hopper to its inlet and plug the unit. Further, with low density materials, the airstream may sweep the dust into the bag section, ruining filter bags and clogging the dust collector.

It is strongly recommended that whatever method is used for material discharge (rotary valve, screw conveyor/pneumatic conveyor, etc.) it should be inspected frequently. This inspection should also be followed at shut down and bag changes.

5) Visible Emissions: Any particulate that can be seen discharging from the exhaust stack is considered visible emissions. These emissions are an indication that there is a breach in a seal or a broken (torn) filter bag. In either case, the leak must be found and corrected immediately. Not only will the emission cause a health concern and damage to property outside the plant, monetary fines imposed by the local authority may also result.
In addition, a fan located downstream of the collector can be damaged from abrasion or become imbalanced if this condition is not corrected quickly.

The exhaust from a dust collector should be continually monitored and checked off in the Inspection Log. Besides visual inspections, one may consider incorporating a "Broken Bag Detector" into the clean air ductwork. Should a bag begin to fail or there be a leak in a bag seal, the particles that bypass the media will be detected. Typically, these detectors use triboelectric or scattered light technologies. These devices can be wired to an alarm horn, siren or flashing light for an immediate acknowledgement of an upset condition.

6) Exhaust Fan: In a dust collection system, an exhaust fan is needed to accelerate ventilation air from the point of pick-up, through the ductwork and dust collector filter media, and out the exhaust stack. A fan is selected to accommodate each application with respect to volume (ACFM) and pressure drop throughout the system. This pressure drop is calculated by evaluating the static resistance of the dust collector, all ductwork and pickup points/hoods.

Should an exhaust fan experience loose or worn belts or an imbalanced impeller, it will not exhaust the volume of air it was originally designed to handle. Without adequate ventilation air, a dust collection system will not operate effectively. Thorough fan inspections are to be performed on a semi-annual basis. However, any time unusual vibration, squealing, or other obvious variances from standard operation is observed, the original manufacturer is to be contacted for their evaluation and comment.

7) Filter Media: The most important item in a dust collector is the filter media because it allows for the accumulation and support of a dust cake. This dust cake is what provides high filtering efficiencies during operation. Periodic inspections of the filter media is extremely important. Inspect the clean air side of the dust collector for leaks, and the filters for tears or holes.

Should the pressure drop within a dust collector become extremely low, relative to historical data, it may be caused by a tear or hole in the filter media.

Should the pressure drop within a dust collector become extremely high, relative to historical data, it may be caused by excessive dust cake or blinding of the filter media.

Excessive dust cake is evident when visually inspecting the filters (when the dust collector is presumed to be clean) and finding them covered with a layer of the collected dust. Should this occur, one could suspect that the cleaning system is not functioning properly. However, if the dust cake has hardened to the bags and will not dislodge easily, the most probable cause is moisture in the dust collector. Moisture in a dust collector may have resulted from dew point excursions, high moisture content in the process gas, in the compressed air supply, or a leak in the collector or ductwork that allowed water to enter the dust collector.

The other obvious cause of high differential pressure may have been caused by blinding of the filters. Blinding can occur from improper start-up conditioning of the filters following the previous filter change. See "Start-Up Procedures" for suggestions on how to minimize the possibility of blinding.

8) Structural Integrity: The structural integrity of equipment can not only affect its performance, but cause health and housekeeping concerns, and reduced equipment life. An overall inspection should be done annually. It is suggested that the welds, joints and flange seals be inspected. Any leaks in the collector must be sealed either mechanically or by using silicone caulking. In a negative pressure system, a breach in a seal or weld will introduce ambient air into the collector. With this air, moisture and contaminants can find their way into the collector. In a positive pressure system, dust will blow out of the collector causing housekeeping problems and a potential health hazard to employees exposed to the dust.

Look for the obvious. Check the structural support members for signs of fatigue and excessive corrosion. Be certain that all fasteners are in place and tightly secured, especially on the ladder and access platform. Replace any missing bolts, clean and re-weld any cross bracing or gussets that may have cracked welds. Look closely at the filter's external walls for corrosion or signs of bowing. Clean and repaint where necessary. Repair any holes that may have developed in the dust collector walls or hopper(s).

9) Auxiliary Equipment: Aside from the dust collector itself, a thorough inspection of any system will include a check of all miscellaneous complimentary equipment. Some of these items may include the exhaust fan, rotary airlock valve, screw conveyor, inlet and/or outlet dampers, etc. It is very important that any ancillary equipment be added to the Inspection Log.

10) Ductwork: Another important component in a dust collection system is the ductwork. If the particulate does not have an opportunity to reach the filters, the dust collector will not be able to perform its function. Standard practices suggest a minimum airstream velocity within any duct of 3500 feet per minute (fpm), and between 4000 and 4500 fpm for heavier dusts. Should the dust travel at lower than adequate velocities, it will tend to settle and accumulate in the ducts choking the system. This restriction of flow will increase the pressure drop in the system, and the energy required to induce the air to move. The resultant will be reduced ventilation air at the pick up points. It is advisable to periodically inspect the entire length of ductwork for dust accumulation. (See page 17 for a list of dusts and recommended duct velocities.)

Start-Up Procedures

Proper start-up procedures will help to extend the life of new filter media in a dust collector. What is generally accepted as "Start-Up" procedures is the process designed to intentionally develop a dust cake on the bags. This we refer to as seasoning or conditioning of the filter media.

Seasoning of a collector's filter bags is one of the most important procedures a company can perform. In a fabric filter dust collector, the filter media is used to support a dust cake.

A dust cake is the porous layer of collected particulate that develops during the conditioning period of new collector bags, and following each cleaning cycle. The process can be accelerated in many installations by introducing a precoat material such as agricultural lime into the system. Commercial precoats are also available.

Following installation of the filter bags and inspection of the related auxiliary equipment, the exhaust fan can be started. However, it is extremely important that the new filter bags *are not* exposed to the full volume (ACFM) of the fan. A reduced volume is recommended during the seasoning process. Close the fan damper (or inlet dampers) to one half open until the monitoring gauge reads approximately 50 to 65% of the manufacturer's recommended maximum flange to flange differential pressure. Once at this level, fully open the damper and continue to monitor the pressure drop. At roughly 75% of the manufacturer's recommended differential pressure, the cleaning system can be initiated. Normal operation and periodic cleaning will bring the pressure drop to a calculable and historically stable level.

Depending upon the application, development of this differential pressure may take a number of hours to a number of days. This is necessary to ensure that the new filter media is exposed to low filtering velocities of dust laden air. Reducing the volume decreases the airstream's velocity (air-to-cloth ratio) protecting the virgin bags from high velocity impingement of dust. Should the bags be exposed to the fan's full volume, fine particles may embed themselves into these inner fibers of the bags and begin a "blinding" condition. This can also damage the fibers of the media which will reduce the life of the filters.

Glossary of Terms

Abrasion Resistance
The ability of a fiber or fabric (media) to withstand surface wear.

ACFM
Actual cubic feet of gas per minute. The volume of the gas flowing per minute at the operating temperature, pressure, elevation and composition.

Air-to-Cloth Ratio
The ratio between ACFM flowing through a dust collector and the square feet of filter area available (ACFM/Ft2). Sometimes referred to as the velocity of air through the cloth.

Air Leakage
Unwanted air intruding into an exhaust system (holes in ducts, missing and ineffective seals, etc.).

Airlock
Term generally applied to a rotary vane valve that keeps air from entering a dust collector, yet allows collected particulate to continuously discharge from the device.

Air Pollution
The presence in the atmosphere of gases, fumes or particulate matter alone or in combination with each other, in sufficient concentration to disturb the ecological balance; cause objectionable effects, especially sensory offenses; cause transient or chronic illnesses; or impair or destroy property.

Air, Standard
Dry air at 70˚ F and 29.92 inches Hg barometric and is approximately equivalent to 0.075 lb/ft3.

Air-to-Media Ratio
The ratio of air volume (ACFM) to square feet of effective filter media area. Also referred to as the apparent or face velocity through the media (FPM). Typically 3 to 20 fpm for bag medias and 0.5 to 6 fpm for pleated-type media.

Air Velocity
Rate of speed of an airstream, expressed in fpm.

Altitude
The height above sea level of a given location. Density corrections for altitude are made using the following formula, where Z is the feet above sea level.
Density (Alt) = Density (Std) x $[1 - (6.73 \times 10^{-6}) Z]^{5.258}$

Baghouse
An air filtration device utilizing fabric filter bags for removing solid particulate from a gas stream (dust collector).

Balancing
(1) On a fan, the process of adding (or removing) weight on a rotor to move the center of gravity toward the axis of rotation. (2) In a ventilation system, it's the process of measuring

or calculating the airflow at a branch and altering duct size or a valve to attain desired airflow at that branch.

Blind (Blinding)
The blockage of filtration media by dust, fume or liquid covering the filter media and not being discharged by the cleaning mechanism. Once enough material has built up, airflow is severely restricted and the elements have to be cleaned or replaced.

Bridging
Material handling problem characterized by the particulate forming a cavity over the discharge or opening of a hopper or storage vessel. Also, the accumulation of collected dust between two or more filter bags.

Can Velocity
In a dust collector with the filter elements suspended from the tubesheet (pulse-jet), "can velocity" is the upward air stream speed calculated by dividing the open cross sectional area of the dust collector (less the area of the filter bags disc bottom) into the full volume of the exhaust fan (ACFM/Ft2 = Feet per Minute). *(See Interstertial Velocity)*

Capture Velocity
The air velocity at any point in front of a hood or at a hood opening necessary to overcome opposing air currents and to capture the contaminated air at that point by causing it to flow into the hood.

Cartridge Filter
An air pollution control device that captures gas-borne particulates by forcing the gas through pleated filter media cartridges. The cartridges are typically made with pleated non-woven media of cellulose with a nanofiber outer layer. One hundred percent spun bond synthetic polyester is also available.

Celsius
A thermometric scale in which water boils at 100˚ and freezes at 0˚, same as centigrade.

$$^\circ C = 0.5556 \times (^\circ F - 32^\circ)\ 5/9 = 0.5556$$

Clean Air Plenum
The area through which gases are directed, located on the clean side of the filters.

Collecting Efficiency
The ability of a dust collector to remove particulate from the exhaust gas. The ratios of particles entering the collection device vs. particles leaving is expressed in percent.

$$\frac{\text{inlet loading} - \text{outlet loading}}{\text{inlet loading}} \times 100$$

Dewpoint
The temperature at which condensation begins to form as the gas is cooled.

Diaphragm Valve
A compressed air valve operated by a solenoid valve that opens to allow a pulse to a row of bags.

Dirty Air Plenum
The dust collector area through which gases are directed, located on the dirty side of the filter bags.

Differential Pressure
The change in pressure or the pressure drop across a device (dust collector) located within an airstream. The difference between static pressures measured at the inlet and outlet of a device. *(See Pressure Drop)*

Dust Cake
A dust buildup on the filter bags that increases the efficiency of the filter media.

Dust Collector (See Types)

Dust Loading
The weight of solid particulate suspended in an air stream, usually expressed in grains per cubic foot (or grams per cubic meter).

Emissions
Particulate that escapes through or around a dust collector into the atmosphere.

Fan
A device for moving air and dust through a ventilation system. If the fan is on the dirty air side of the dust collector, it is called a positive system. If the fan is on the clean air side of a dust collector, it is called a negative system.

Filter Media
The permeable barrier utilized in a fabric style dust collector on which the dust cake is supported (bag).

Hopper
The section of a dust collector located below the filter bag housing utilized for the accumulation and discharge of the collected dust.

Impingement
The physical contact of a dust laden gas flow against a filter media. Typically referred to the abrasive wear caused by this impact.

Inches of Water
A unit of pressure equal to the pressure exerted by a column of water one inch high at standard conditions (70˚F @ sea level), usually expressed as inches water gauge ("w.g.) or inches water column ("w.c.).

Interstitial
The openings or voids in a filter media.

Interstitial Velocity
Velocity of a gas as it passes between a compartment of filter bags calculated at its highest value. *(See "Can Velocity" for formula)*

Magnehelic® Gauge
An instrument used to measure the differential pressure drop in a dust collector.

Manometer
A U-shaped tube filled with a specific liquid. The difference in height between the liquid in each leg of the tube gives the difference in pressure on each leg of the tube. Used to monitor differential pressure.

Micron (_m)
A unit of length, 1/1000 of one millimeter (1/24,000 of an inch).

Negative Pressure Dust Collector
A system where the fan is located after the dust collector on the clean air side, pulling air through the system.

OEM
Original Equipment Manufacturer.

Particulate
Any airborne solid material.

Permeability
A measure of fabric porosity of openness, expressed in cubic feet of air per minute per square foot of fabric at a 0.5" w.c. pressure differential.

Photohelic® Gauge
An instrument used to measure the differential pressure drop in a dust collector and to initiate the cleaning system by means of adjustable "high" and "low" set points for automatic actuation of a sequential timer.

Positive Pressure Dust Collector
A system with a fan located prior to a dust collector on the dirty side, pushing air through the system.

Precoat
Material added to the air stream at start-up to aid in establishing the initial dust cake on the filter bags.

Pressure Drop
A measure of the resistance the gas stream encounters as it flows through the dust collector. It may refer to pressure differential across the media, across the dust collector, or the pressure drop across the entire system, depending upon the points of measurement.

Pulse Cycle
The interval of time between pulsing one row of bags and pulsing that same row again.

Pulse Duration (On-Time)
The length of time a pulse lasts, generally described as the length of time the electrical signal holds the solenoid pilot valve open.

Pulse Delay (Off-Time)
Elapsed time between pulses in a dust collector cleaning system.

Pulse Jet Collector
A baghouse using short intermittent pulses of compressed dry air to clean dust from the filter bags.

Re-entrainment
The phenomenon where dust is collected from an air stream and is then returned to the air stream. This occurs when dust is dislodged from a filter bag during cleaning and is again captured by the same or an adjacent filter bag.

Reverse Air Baghouse
A dust collector where cleaning is accomplished by mechanically, and temporarily, preventing the dirty gas flow into a compartment or group of filter bags while blowing low pressure cleaning air through these "off-line" bags in the opposite direction of typical air flow, to dislodge the accumulated dust cake.

Rotary Airlock Valve
Device having a star wheel (rotor) designed to provide an air tight seal between the negative or positive pressures of the collector and the outside atmosphere.

Screw Conveyor
A revolving screw operating in a fixed trough for conveying material from one point to another. Note: Should a screw conveyor be used in a dust collector system, an airlock is still required to ensure ventilation air does not bypass through the conveyor.

SCFM
Standard cubic feet per minute. The volume of gas flow per minute at standard temperature and pressure conditions (70˚F @ sea level).

Shaker Baghouse
A dust collector where cleaning is accomplished by manually or automatically shaking the bags to dislodge the accumulated dust cake. Typically, the airstream within the baghouse is in a static condition during the shaker cleaning cycle.

Solenoid Valve
An electromechanical plunger device that is either "normally open" or "normally closed". In use with a dust collector, it is for the relief of air pressure to activate a compressed air device such as a diaphragm valve.

Timer, Sequential
An electrical mechanism that activates a dust collector's cleaning system.

Tubesheet
A steel plate to which the open end of the filter bags are connected. This wall separates the clean air and dirty air plenums of the dust collector.

Venturi
A cone-shaped device located at the top of a tubular filter bag in a pulse-jet dust collector which creates a negative pressure at the top of the venturi for pulling additional air down into the filter elements during pulsing.

Weight (Media)
The average weight per square yard of fabric.

System Design Information

RECOMMENDED DUCT VELOCITY RANGES		
Nature of Contaminant	**Examples**	**Design Velocity, FPM**
Vapors, gases, smokes	Solvent, oil smoke, plasticizer smoke	1,000-2,500
Fumes	Welding	2,000-2,500
Very fine light dusts	Wood flour, litho powder, toner	2,500-3,000
Average industrial dusts	Sawdust, grinding dust, buffing lint (dry), mineral dust, general materials handling, foundry dust, limestone dust	3,500-4,500
Heavy dusts	Metal turnings, wood hog waste, brass turnings, lead dust	4,000-4,500
Heavy or moist dusts	Lead dust with small chips, moist cement dust, buffing lint (sticky), pneumatic conveying	4,500 and up

TYPICAL DUST COLLECTOR EQUIPMENT	
DESIGN PRESSURE DROPS	
DUST COLLECTORS	
EQUIPMENT	**PRESSURE DROP, "w.g.**
Cartridge Collector	2 - 5
Baghouse Collector	3 - 6
Envelope Collector	3 - 6
Cyclone Collector*	2 - 9
Cyclone Scroll Outlet	2 - 3
Cyclone Afterfilter	4 - 6
Oil Mist Media Collector	2 - 4
OTHER ACCESSORIES	
EQUIPMENT	**PRESSURE DROP, "w.g.**
Typical Duct Losses	2.5 - 6.0
Silencer, Duct	0.5 - 1.0
Silencer, Chamber	0.5 - 1.0
Safety Afterfilter	1.0 - 2.0
HEPA Afterfilter	2.0 - 3.0
Spark Trap	1.0 - 2.0
Evase' (static pressure regain)	- 1.0
SYSTEMS	
Typical System	8.0 - 18.0

AIR-TO-MEDIA RATIO CONSIDERATIONS		
	Increase	**Decrease**
Dust Characteristics	**Air-To-Media Ratio**	**Air-To-Media Ratio**
Particle Size	Coarse	Fine
Particle Shape	Granular	Fibrous
Particle Density	Heavy	Light
Particle Concentration	Low	High
Particle Bonding	Non-Agglomerating	Agglomerating
Electrostatic Tendencies	No	Yes
Operating Hours	Low	High

Trouble Shooting

Following we have included some basic trouble shooting information and work sheets. Please consult the original equipment manufacturer for more detailed information or procedures in regards to your specific equipment.

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 baghouse just below the tubesheet.

Clean or replace it as required.

Cleaning Arm is Not Rotating

Inspect the arm drive components. The drive chain should be supple, well lubricated, and properly tensioned. Check the gearmotor for operation and lubrication. Check the bearings on the arm shaft, which are located at the tubesheet and at the top side of the support channels.

Cleaning Fan Malfunction

Check that the fan is running and with the correct wheel rotation, CW from the motor side. Check the motor nameplate to verify that the motor is operating at 3450 RPM. Check the RPM with a tachometer if there is any doubt.

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 preheat 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.

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.

<u>Problem: Low differential pressure across the tubesheet</u>
(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 in the line. It is located on the inside of the baghouse 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
(Possible causes with solutions)

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.

Leaks
Look carefully for gaps or uncaulked areas between the tubesheet sections on large panelized filters.

Problem: Poor Bag Life
(Possible causes with solutions)

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 preheat 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
(Possible causes with solutions)

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.

The above is intended as a quick reference for common problems that may be encountered with a baghouse dust filter. If you are experiencing any difficulties that are not covered here or have any questions please refer to your original equipment manual.

Conclusions and Acknowledgments

We at *AirSys Tech Inc* want our customers to know as much as they can about the proper operation and maintenance of a dust collection system. With this information as a guide, a maintenance program can be developed for any dust collection system. However, it is not our intention to offer this as an all inclusive list. Each piece of equipment and application is different, and each with its own unique components and features. They should be noted in your program as important to the operation of your equipment and monitored accordingly.

The information found in this document is gathered from a number of sources and manufacturers. We wish to thank them for the information that they have assembled.

This guide is meant for information only and not as a substitute for good operating practices. Always refer to the original equipment manufactures instructions for operating, start-up, trouble shooting and maintenance.

<u>Sample Inspection Logs</u>

As a convenience, we have included an "Inspection Log" for some of the different styles of dust collectors. These logs may be used as is, or modified to fit a specific installation. In either case, they cover some of the important items that should be monitored to maintain an effective and efficient dust collection system. An added benefit is the development of an accurate history of operation, should questionable performance be experienced at a later date.

Please follow the original equipment manufacturers maintenance and inspection procedure in addition to what you find here.

Inspection Log

Reverse or Medium Pressure Dust Collector

Dust Collector #: ______________________ *Model No.* ______________________

Date					
Time					
Inspector					
Daily					
Record Differential Pressure (ΔP)	"wc	"wc	"wc	"wc	"wc
Is timer sequencing, row by row?	Y / N	Y / N	Y / N	Y / N	Y / N
Are solenoids operating?	Y / N	Y / N	Y / N	Y / N	Y / N
Are diaphragm valves firing?	Y / N	Y / N	Y / N	Y / N	Y / N
Hopper discharge device operating?	Y / N	Y / N	Y / N	Y / N	Y / N
Any visible stack emissions?	Y / N	Y / N	Y / N	Y / N	Y / N
Weekly					
Check tubesheet for bag leaks.	( )	( )	( )	( )	( )
Check that hopper is empty.	( )	( )	( )	( )	( )
Monthly					
Are there leaks in access doors?	Y / N	Y / N	Y / N	Y / N	Y / N
Check door seals for deterioration.	( )	( )	( )	( )	( )
Check air lines & fittings for leaks.	( )	( )	( )	( )	( )
Check Cleaning arm components	( )	( )	( )	( )	( )
Semi-Annually					
Check bag condition (dirty side).	( )	( )	( )	( )	( )
Check fan, belt tension, etc.	( )	( )	( )	( )	( )
Annually					
Check for corrosion.	( )	( )	( )	( )	( )
Check all bolts and welds.	( )	( )	( )	( )	( )
Check ductwork for build up of dust.	( )	( )	( )	( )	( )
Greasing	( )	( )	( )	( )	( )

*Lubrication of bearings, reducers, etc. should be done periodically and per specific Manufacturer's O & M manuals recommendation.
Schedule maintenance and/or repair of any malfunctioning components, excessive corrosion or parts' replacement.

Notes/Comments: ______________________________

Inspection Log — Pulse Jet Dust Collector

Dust Collector #: ______________________ *Model No.* ______________________

Date					
Time					
Inspector					
			Daily		
Record Differential Pressure (ΔP)	"wc	"wc	"wc	"wc	"wc
Is timer sequencing, row by row?	Y / N	Y / N	Y / N	Y / N	Y / N
Are solenoids operating?	Y / N	Y / N	Y / N	Y / N	Y / N
Are diaphragm valves firing?	Y / N	Y / N	Y / N	Y / N	Y / N
*Hopper discharge device operating?	Y / N	Y / N	Y / N	Y / N	Y / N
Any visible stack emissions?	Y / N	Y / N	Y / N	Y / N	Y / N
			Weekly		
Record compressed air pressure.	PSIG	PSIG	PSIG	PSIG	PSIG
Clean compressed air filter trap.	( )	( )	( )	( )	( )
Check tubesheet for bag leaks.	( )	( )	( )	( )	( )
Check that hopper is empty.	( )	( )	( )	( )	( )
			Monthly		
Are there leaks in access doors?	Y / N	Y / N	Y / N	Y / N	Y / N
Check door seals for deterioration.	( )	( )	( )	( )	( )
Check air lines & fittings for leaks.	( )	( )	( )	( )	( )
Blow out ΔP gauge lines.	( )	( )	( )	( )	( )
			Semi-Annually		
Record pulse duration.					
Record pulse delay.					
Check bag condition (dirty side).	( )	( )	( )	( )	( )
Check pulse pipe alignment.	( )	( )	( )	( )	( )
Check fan, belt tension, etc.	( )	( )	( )	( )	( )
			Annually		
Check for corrosion.	( )	( )	( )	( )	( )
Check all bolts and welds.	( )	( )	( )	( )	( )
Check ductwork for build up of dust.	( )	( )	( )	( )	( )
Greasing	( )	( )	( )	( )	( )

*Lubrication of bearings, reducers, etc. should be done periodically and per specific Manufacturer's O & M manuals recommendation.
Schedule maintenance and/or repair of any malfunctioning components, excessive corrosion or parts' replacement.

Notes/Comments: ______________________

Inspection Log   Cartridge Dust Collector

Dust Collector #: ______________________   *Model No.* ______________________

Date					
Time					
Inspector					
Daily					
Record Differential Pressure (ΔP)	"wc	"wc	"wc	"wc	"wc
Is timer sequencing, row by row?	Y / N	Y / N	Y / N	Y / N	Y / N
Are solenoids operating?	Y / N	Y / N	Y / N	Y / N	Y / N
Are diaphragm valves firing?	Y / N	Y / N	Y / N	Y / N	Y / N
*Hopper discharge device operating?	Y / N	Y / N	Y / N	Y / N	Y / N
Any visible stack emissions?	Y / N	Y / N	Y / N	Y / N	Y / N
Weekly					
Record compressed air pressure.	PSIG	PSIG	PSIG	PSIG	PSIG
Clean compressed air filter trap.	( )	( )	( )	( )	( )
Check tubesheet for cartridge leaks.	( )	( )	( )	( )	( )
Check that hopper is empty.	( )	( )	( )	( )	( )
Monthly					
Are there leaks in access doors?	Y / N	Y / N	Y / N	Y / N	Y / N
Check door seals for deterioration.	( )	( )	( )	( )	( )
Check air lines & fittings for leaks.	( )	( )	( )	( )	( )
Blow out ΔP gauge lines.	( )	( )	( )	( )	( )
Semi-Annually					
Record pulse duration.					
Record pulse delay.					
Check cartridge condition.	( )	( )	( )	( )	( )
Check fan, belt tension, etc.	( )	( )	( )	( )	( )
Annually					
Check for corrosion.	( )	( )	( )	( )	( )
Check all bolts and welds.	( )	( )	( )	( )	( )
Check ductwork for build up of dust.	( )	( )	( )	( )	( )
Greasing	( )	( )	( )	( )	( )

*Lubrication of bearings, reducers, etc. should be done periodically and per specific Manufacturer's O & M manuals recommendation. Schedule maintenance and/or repair of any malfunctioning components, excessive corrosion or parts' replacement.

Notes/Comments: ____