Ventilation Products for Use In Hazardous Locations

Explosion-Proof Blower Ventilation Kit

SVB-E8XCUP

For Use In Hazardous locations

Pneumatic Ventilation Kit

SVB-A8CUP

SVB-E8EXP

Explosion-Proof Electric Blower

- Explosion-proof switch installed and wired with 25 foot cord, no plug, user wired per NEC requirements
- 3/4 HP electric motor, 115 VAC, 12.6 amp
- Approved for Class I, Div. 1, Groups C and D Class II, Div. 1, Groups E, F, G
- CSA approved and CE registered
- Conductive polyethylene fan housing
- Aluminum non-sparking blower wheel
- Static grounding lug installed
- Powder coat tubular steel frame with dual handles
- Molded safety guards
- 8" intake and exhaust flange
- **Weight:** 72 lbs.
- 1570 cfm free air delivery

SVB-A8

Pneumatic Air Powered Blower Intrinsically Safe Operation

- Ultra-quiet operation – under 80 dbA
- 4HP air motor, operates from 10 - 100 psi
- Ultra-quiet operation – under 80 dbA
- CE registered
- Conductive polyethylene fan housing
- Aluminum non-sparking blower wheel
- Static grounding lug installed
- Powder coat tubular steel frame with dual handles
- Adjustable flow output regulator
- In-line moisture separator/lubricator provided as standard
- Air Systems' unique muffler and oil coalescing filter installed at air motor discharge
- 8″ intake and exhaust flange
- Molded safety guards
- **Weight:** 61 lbs.
- 1500 cfm free air delivery, at min psi and cfm

All Conductive Blower Kits Include:

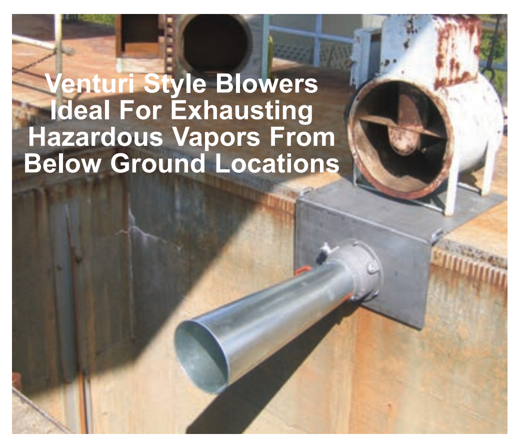
1) Pneumatic or explosion-proof Blower
2) Industrial Saddle Vent®- SV-189CND
3) 90° elbow for Saddle Vent®- SV-90CDND
4) 15 foot duct - SVH-CND815
5) 6 foot duct - SVH-CND86
6) Duct canister - SVH-DC25
7) Universal mount - SV-UM

SVF-10EXP

For Use In Hazardous locations

10" In-Line Explosion-Proof Electric Axial Fan

- **Frame:** All steel, powder coat red with rubber base feet
- Inlet/exhaust flange made of molded conductive polyethylene
- **Explosion-proof Electric Motor:** 1/3 HP, 115 VAC, 1-phase, 60 Hz. UL and CSA Approved for Class 1, Div. 1, Groups C and D, Class 2, Groups E, F, and G
- Automatic reset thermal overload
- **Power cord:** 10 foot SOOW cable with installed strain release
- External on/off switch
- Grounding lug installed on steel housing on explosion-proof model
- **Flow:** 1390cfm free air delivery
- 72 dbA @ 3ft.
- **Weight:** 38 lbs
- Customer supplied plug



10" Inline Explosion-Proof Fan Ventilation Kit

SVF10EXCUP

Full Line Catalog Available at www.airsystems.com

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VENTILATION TRAINING

Controlling & Removing Static Electricity During Confined Space Entry Ventilation

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Controlling & Removing Static Electricity During Confined Space Entry Ventilation

By: Dave Angelico, President
Air Systems International, Inc.

The Safety Industry needs a clear well defined "How-To" Standard on the proper procedures for controlling and safely removing electrostatic charges during confined space ventilation.

Working in tanks, manholes and underground vaults are some of the most dangerous and potentially lethal occupations found in the industrial work environment. Federal, State and corporate safety departments have written reams of documents and procedures on how to safely enter a confined space and perform some sort of maintenance, repair or cleaning operation. Good corporate work practices and procedures have existed for years at the industry specific level. The telecommunications companies, chemical, pharmaceutical and oil storage and refineries have long seen the necessity of a "How To" manual for work on their own specific confined space hazards. The current OSHA Standard, 1910.146 **"Permit-required Confined Spaces"**, goes a long way to providing General Industry the safety framework for entering and exiting a confined space and identifying some of the hazards a worker may encounter. This OSHA Standard was the outgrowth of many existing standards that came together to provide minimum guidelines for General Industry to follow. **The one process needed in the OSHA Standard is a specific work practice for the safe removal of static electricity during confined space ventilation and a means to test it.** This work practice should be simple enough for all industry trades to be able to perform.

Meeting Industry Demands

As a manufacturer, we have to be responsive to the wants and needs of our customers. Since the development and marketing of the first Saddle Vent® confined space entry ventilation system in the early 1990's, we have constantly been asked by companies, contractors, military and consultants, **"How do you properly handle the potential problem of static electricity build-up on the plastic surface of the Saddle Vent® and the ducting when you are ventilating a tank or manhole?"** The art and science of ventilation has many textbooks and articles to help in the quest for understanding the many ventilation techniques used in industry. However, the one technical area that is very sketchy involves ventilation with regard to the potential disastrous problems of electrostatic charge build-up. Many of the corporate and government procedures reference that static charges should be removed while ventilating but few tell the worker **"How-To Do It"**. After reviewing a great many standards and procedures, it appears that the best source for understanding this phase of the confined space ventilation procedure comes from an industry specific source, ANSI/API Standards 2015 and 2016, published by the American Petroleum Institute in Washington, D.C.; another excellent source is NFPA 77. These documents provide requirements and actual procedures for safe entry and work in confined spaces and more specifically they address the issues with regard to controlling static electricity. **The one ingredient missing in these standards is the aspect of "How-To Set Up and Test" a complete grounded ventilation system.**

Static Electricity - The Basics

At some time in our lives we have all felt the effect of static electricity build-up. Walking across the living room carpet and touching a metal doorknob or refrigerator and we feel and see the spark of discharged static electricity. Static is generated whenever two dissimilar materials are in relative motion to each other. I recently was filling my car with gasoline and I noticed a Warning Notice on the gas pump. The manufacturer of the gas pump very plainly and simply explained that if I get out of my car to put fuel in the tank, please do not get back in the car with fuel pumping until I touch the front frame of the car and discharge any potential build-up of static electricity or a resulting explosion could occur. About three years ago, a Safety Director at an Ohio hospital complex called me after he purchased an explosion-proof blower system, with a Saddle Vent® and conductive ducting from Air Systems. He asked me how he should test the system to assure he was achieving a good ground and he was dissipating static electricity. He explained to me every ventilation system in their hospital was grounded and had to be tested to assure it had a good ground so no static electricity was able to build up on their fans and blowers. These examples brought to my attention a safety industry need to address the specific treatment of the problem of static electricity being developed with current ventilation products. The standard plastic hose ducting and the original standard polyethylene Saddle Vent® both can generate and hold static charges on the inside and surface of the duct; these two areas are both sources of ignition from static build-up.

Free electrons will be attracted to any other electron deficient nucleus. Movement of electrons from one atom to another constitutes what is referred to as electrical energy, including static electricity. What causes these electrons and static charges to migrate from one atom to another? The movement of static charges is due to such factors as a small change in temperature, atmospheric pressure, relative humidity and the friction of air through a piece of ducting. The energy needed to cause this movement of atoms is surprisingly very low. Even though all matter contains free electrons, these electrons are unable to move freely through materials with high electrical resistance; these items are called nonconductors or insulators. Examples of non-conductors would be glass, certain gases, rubber and many plastic materials. Standard non-conductive vinyl air duct (hose), the traditional industry standard, is used in most confined space ventilation applications and even properly grounded, the displaced electrons can become trapped on the surface of the plastic ducting. When a substance of opposite polarity comes in contact with a non-conductive device, the trapped electrons can flow freely between the two materials. This sudden and rapid transfer of electrons can cause a spark of sufficient intensity to ignite a confined space that may contain industrial solvents, methane gas from decaying material, hydrocarbon residue or fine airborne dust. NIOSH references that a low relative humidity, below 50%, can accelerate the build-up of electrostatic charges creating sufficient energy to ignite flammable atmospheres.

Abrasive blasting operations in confined spaces can cause a tremendous build-up of static charges by the mechanical friction of the blasting material. This static build-up can provide the charge necessary to cause an intense explosion of the dusty space. **NFPA states that if a hazard exists or has a potential to exist, the work environment should be evaluated with regard to the potential of static electricity build-up.**

The following questions need to be asked:

1) Can a static charge be generated?
2) Will the charge be able to accumulate?
3) Can a discharge of static electricity occur?
4) Will an ignitable mixture be present at the site of the discharge?
5) Will the discharge have sufficient energy to ignite the mixture?

The Proper Ventilation System

NFPA, OSHA and ANSI/API Standards reference good work practices in a confined space necessitates continuous ventilation before and during the work performed in a confined space. The objective of a good ventilation system is to gas free the confined space before occupancy and then to stabilize the confined space by providing continuous fresh air to the workers during occupancy. ANSI/API recommends the use of a venturi type eductor air mover or an explosion-proof electric blower. The electric motor and on/off switches must be approved, at a minimum, for use in Class I, Division 1, Group D atmospheres for methane and Class II, Division 1, Groups E, F, and G for dust hazards. Each blower selected must have a metal grounding lug located on the blower. This lug is used to connect the conductive ducting and its wire helix to the blower to form an electrical bond. Ducting should be supplied with fabric manufactured with a conductive coating material and a 12" grounding wire attached to each end of the metal helix inside the duct. The bonding process is simply where components in the ventilation system are connected to form a conductive path that ensures electrical continuity and the flow of static electricity will travel back to a safe grounded source-the electric blower or an earth ground. In performing tank work, the entire blower system is bonded to the tank that is connected to a proper earth ground. ANSI/API Standards 2015 and 2016 provide detail how the use of a venturi style eductor along with an explosion-proof electric blower can be used to accomplish a preferred push/pull method of confined space ventilation. **The one aspect of this ventilation set-up that is missing is how to test the system once it is in place and assure a proper electrical bond has been achieved. (What level or range of resistance, in ohms, are sufficient to remove static charges?)**

Solution: The Conductive Saddle Vent® Ventilation Technique

Test for Conductivity

Part of a good confined space entry program is having met the objectives listed in the OSHA 1910.146 and ANSI/API Standards. One important objective is the aspect of self rescue. The use of the Saddle Vent®, air conduit device, allows the worker to establish continuous ventilation in the confined space without obstructing the entry or egress of the workers. This Saddle Vent® device meets the objective of self-rescue for workers who may encounter a hazardous work environment and need to rapidly egress the confined space. The second key objective of a safe confined space entry ventilation program is to provide a ventilation system that eliminates the build-up of static electricity and its potential ignition hazard. The original Saddle Vent® device and 90 degree elbow is now available in conductive plastic material. This Conductive Saddle Vent® connects to sections of conductive ducting and when properly assembled, forms a complete electrical circuit (bond) from the farthest end of the duct all the way back to the grounded ventilation blower. **Electrostatic charges that traditionally would build up on the surface of the Saddle Vent® and ducting can now be safely removed through the use of conductive plastics; this process is called the Conductive Saddle Vent® Ventilation System.**

Test the Ventilation System for Conductivity

Prior to the start of the ventilation process, the entire Conductive Saddle Vent® Ventilation System should be set-up and tested to assure a complete circuit has been achieved. The ventilation system should include a pneumatic or explosion-proof electric blower, a Conductive Saddle Vent®, conductive duct with attached ground wires on each end; all components should be attached together properly, prior to testing. A lead from a volt/ohm meter should be attached to the farthest end of the ducting and its metal helix and the other lead should be attached to the metal frame or ground lug of the blower. The volt/ohm meter should provide a reading between 50K and 350K ohms and prove the existence of an electrical circuit. This resistance range will provide adequate conductivity for the static charge build-up to drain to a properly grounded source through the blower's electric cord or earth ground.

Conclusion

Confined space entry is hazardous for even the most seasoned professionals. Unfortunately, most of the work done in confined spaces is done on an occasional basis with less than expert workers. It is only a matter of time when all the right conditions of fuel, oxygen and ignition come together to form another newspaper or magazine headline. We believe OSHA needs to seek the guidance and expertise of industry professionals to write additional "How To" procedures to aid and assist the occasional confined space worker on handling and removing static electricity when ventilating. The use of a work specific device like the Conductive Saddle Vent® System will eliminate one more potential hazard from the confined space worker's list of potential problems. The objective of any safety device is to eliminate a hazard or potential hazard and reduce the possibility for catastrophic accidents. This article brings to light an improved 21st century technique for greater worker safety with regard to controlling static electricity in confined space entry ventilation. The atmosphere within a confined space can change very rapidly and deadly; don't assume a static discharge can't happen to you or your workers.

Control your work environment - Choose the Conductive Saddle Vent® Ventilation System.