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MICRO AIR

Special Bulletin: OSHA Combustible Dust Emphasis Program and NFPA Changes

Special points of interest:

- Interpretation of the changes required by the OSHA combustible dust emphasis program.
- Applicable Areas of NFPA 68, 2007 Edition
- Applicable Areas of NFPA 69, 2008 Edition
- Applicable Areas of NFPA 484, 2009 edition
- Applicable Areas of NFPA 654, 2006 Edition



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Regarding OSHA or NFPA Compliance on the Micro Air RP Series of dust collectors.

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OSHA makes program changes due to a series of dust related explosions in the sugar, petrochemical and metalworking industries.

While this program is not an OSHA standard yet, nor has it been passed into law by Congress, the "OSHA National Combustible Dust Emphasis" program was implemented to reduce the number of fatalities related to workplace explosions. While this is not a standard, non-compliance with the program can and has already resulted in fines and has required process changes in the industries affected by the change. The main attention is focused on the following industries:

- Metal Dust such as aluminum and Magnesium.
- Wood Dust
- Coal and other carbon dusts
- Plastic dusts and additives
- Bio-solids
- Other organic dust such as sugar, flour, paper, soap and dried blood
- Certain textile materials

But, local inspectors have the leeway to also look at any other type of dust deemed to be a potential explosion hazard. OSHA inspectors are specifically looking for potential ignition sources and the accumulation of dust in the plant which could fuel a secondary, and usually more powerful blast. This could occur if

an explosion ever happened in a dust collector or plant equipment, causing the dust accumulations on rafters, floors and other flat surfaces to shake loose and become airborne in a concentration that, if ignited would cause the secondary explosion. To that end, housekeeping becomes an area of vital importance. OSHA inspectors are looking for dust accumulations that are at least 1/32" thick and over a surface area exceeding 5% of floor area of any given room or plant. If the inspector deems it necessary, samples of dust must be sent to a testing laboratory to gauge their level of explosiveness. This is site and dust specific and generally accepted values for the dust are no longer considered to be valid. If the dust is considered to be a hazard, any dust collector located in the building or outside the building must now comply with all applicable NFPA standards.

In addition, the program emphasizes the need for prevention of dust clouds forming off of equipment such as grinders, mixers or other dust producing operations. Thus, the need for properly equipped dust collection is further mandated within the program.



Explosion at Imperial Sugar in February 2008. (Port Wentworth, GA)



Conveyor Fire caused secondary explosion in this manufacturing facility.



Micro Air RP8-2 Collector Equipped with Explosion Vents

See links to the latest regulations at our website

www.microaironline.com

Or At

www.osha.gov

And

www.nfpa.org

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NFPA 654-Standard for prevention of fire and dust explosions from the manufacturing, processing and handling of combustible particulate solids.

Items of Interest and Micro Air's Interpretation():**

- ◆ Particulate processing systems shall prevent fire or explosion from propagating from one process to another.

Interpretation - There must be dampers or a suppression system in any ductwork leading to and from a unit. Dampers or suppression system must be placed in a manner that there is no possible way an explosion could cause a secondary explosion.

- ◆ Recycling of air-material separator exhauster to buildings shall be permitted if the system is designed to prevent both return of dust with an efficiency of 99.9 percent at 10 microns and transmission of energy from a fire or explosion to the building.

Interpretation - Clean air can be brought back into the building so long as the efficiency is greater than 99.9% (all Micro Air Cartridge Systems are 99.99% efficient and meet this requirement), and there is a damper or suppression system on the exhaust ductwork that meets NFPA standards.

- ◆ The design of explosion protection for equipment shall incorporate one or more of the following:

- * Deflagration Venting
- * Deflagration pressure containment systems in accordance with NFPA69
- * Deflagration suppression systems in accordance with NFPA69
- * Dilution with a noncombustible dust to render the mixture noncombustible
- * Deflagration venting through a listed dust retention and flame arresting device.
- * Isolation devices shall include the following:
 - * Chokes (i.e. Screw conveyor)
 - * Rotary valves
 - * Automatic Fast acting valve systems in accordance with NFPA69.
 - * Flame front diverters in accordance with NFPA 69.
 - * Chemical isolation systems in accordance with NFPA69.

- ◆ Isolation devices shall not be required if a documented risk evaluation that is acceptable to the authority having jurisdiction determines that deflagration propagation will not occur.
- ◆ Dust Collectors shall be located outdoors. A risk evaluation shall be permitted to be conducted to determine the level of explosion protection to be provided.
- ◆ Manifolding of dust collection ducts to air-material separators shall not be permitted unless interconnected on the same process stream or each duct is isolated prior to manifolding.
- ◆ Air material separators shall be constructed of non-combustible material.
- ◆ Access doors shall be provided and bonded and grounded.
- ◆ Continuous suction to minimize the escape of dust shall be provided for processes where combustible dust is liberated in normal operation.
- ◆ The dust shall be conveyed to dust collectors.

NOTE:

Wood, food processing, agricultural and metal dusts have their own separate standards that would apply in lieu of this general standard.

Statements made in this document reflect Micro Air's interpretations of the applicable standards as they are written today , 9/23/09 and should be noted that we do not represent an official OSHA or NFPA interpretation in any way. These interpretations are subject to change at any time and we highly recommend that you contact Micro Air or the appropriate Authority Having Jurisdiction in your area for further updates.

NFPA 484, 2009 Edition-Standard on Combustible Metals

SPECIAL NOTE: This standard only applies to Aluminum, Magnesium, Niobium, Tantalum, Titanium, Zirconium and other combustible metals. It does not apply to non-metallic dusts. Dust is considered to be explosive if it is a finely divided metal 425 microns (40 mesh) or smaller. (**)

Aluminum and Tantalum

- ◆ Ductwork shall be electrically bonded and grounded and moisture tight if exposed to weather or moisture. Plastic or non-conductive ducts shall not be used. Ducting shall be as straight and as short as possible.
- ◆ Minimum duct transport velocities shall be 4500 feet per minute.
- ◆ Deflagration Venting shall be provided on ductwork. These vents shall relieve to a safe location outdoors. The only alternative is to use explosion isolation systems.
- ◆ Dry-type dust collectors shall be located outdoors and be provided with barriers or other means for protection of personnel.
- ◆ The area around the dust collector shall be posted with a sign that reads as follows:
 - ◆ CAUTION: This dust collector can contain explosible dust. Keep outside the marked area while equipment is operating.
 - ◆ Dust collectors shall be constructed of metal. The system must also be bonded and grounded.
 - ◆ Cleaned air may not be returned to the building.
 - ◆ The dust collector shall have deflagration venting.
 - ◆ Cartridge filters shall be manufactured to dissipate static electric charges.(Grounding Straps)
 - ◆ Grinding systems shall not be served by the same dust collection system as buffing and polishing operations.
 - ◆ Dust Collection Systems shall be for aluminum and aluminum alloys only. No other materials can be captured in the dust collector without a complete teardown and cleaning of the dust collection system
 - ◆ Dust shall be removed from barrels or trays daily.

Magnesium, Niobium, Titanium and Zirconium

- ◆ Dry type dust collectors shall not be used.

Other Combustible Metal Dusts

- ◆ Dry-Type dust collectors shall be located outside of buildings.
- ◆ Grinding operations shall not be served by the same dust collection system as buffing and polishing operations.
- ◆ Individual machines with portable dust collectors can be used indoors when the object being processed or finished is incapable of being moved to a fixed hood or enclosure.
- ◆ For Plasma spray operations, the dust collectors must be located “at a distance from the point of collection”.
- ◆ A documented risk evaluation acceptable to the authority having jurisdiction shall be conducted to determine the level of explosion protection to be provided for a dust collection system.
- ◆ Recycling of exhaust air into buildings shall be prohibited.
- ◆ Dry type collectors shall be fabricated of conductive material and grounded or bonded.
- ◆ Dry-Type dust collectors shall be equipped with deflagration vents.

Chapter 13 – SPECIFIC TO ALL METAL DUSTS

- ◆ Fire prevention, fire protection and emergency response is retroactive:
 - ◆ An inspection, testing, and maintenance program shall be implemented.
 - ◆ Records of the inspections shall be kept.
 - ◆ Fugitive combustible metal dust shall not be allowed to accumulate.

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NFPA 68, 2007 Edition-Standard on Explosion Protection by Deflagration Venting

Items of Interest and Micro Air's Interpretation(**):

- ◆ Vent sizes shall be based on K_{st} and P_{max} of the dust mixture. Where the composition of the dust mixture is not certain, the vent size shall be based on the highest K_{ST} and P_{max} of all the components. Where actual material is not available for test, vent sizing shall be permitted to be based on K_{st} values for similar composition materials of particle size no greater than the specified particle size range per the chosen standard. When the actual material is available, the K_{st} shall be verified by test.

Interpretation: *If your customer has a proprietary dust or a mixture they do not want to pay for testing on, use the K_{st} from the tables of known values showing the highest level in the mixture. The customer should provide you with documentation stating the maximum K_{st} they believe is present.*

- ◆ If it is necessary to locate enclosures with deflagration vents inside of buildings, vent ducts shall be used to direct vented material from the enclosure to the outdoors. A vent duct shall have a cross section at least as great as that of the vent. Vent ducts with total lengths of less than one hydraulic diameter shall not require a correction to increase the vent area. Vent ducts shall be non-combustible and strong enough to withstand the p_{max}. Where external venting is not feasible, a device that operates on the principles of flame arresting and particulate retention shall be permitted to be used. This device shall be listed and within the tested K_{st}, P_{max} and enclosure type. The areas adjacent to the discharge point shall be clear of combustible dusts.

Interpretation: *It is still okay to keep the dust collector indoors so long as it is vented in the proper manner or flameless venting is used.*

NFPA 69, 2008 Edition-Standard on Explosion Suppression Systems

Items of Interest and Micro Air's Interpretation(**):

- ◆ The new NFPA 69 2008 Standard is not retroactive unless it is required by another AHJ (Authority having jurisdiction).
- ◆ Suppression systems are allowed.
- ◆ Active Isolation (automatic pneumatic dampers) or passive Explosion venting in the duct is required.

Interpretation: *Use of explosion vents designed by Micro Air are engineered to meet all applicable standards. You have three choices to use on the intake and exhaust ductwork:*

1. *Automatic pneumatic dampers to prevent propagation of dust explosions back through the ductwork.*
2. *Passive explosion venting on the ductwork itself.*
3. *Suppression systems can be used (cannons) on the intake and exhaust.*

How the Micro Air RP Series of Dust Collectors can help you comply

1. Micro Air offers a complete NFPA/OSHA compliance package as an option on all with our dust collectors.
2. Micro Air and our local distributors offer the expertise needed in system design.
3. Micro Air offers retrofit kits for your existing Micro Air dust collection systems.
4. Micro Air products have been tested and engineered to meet the requirements set forth by OSHA and NFPA. We will supply the documentation required to fulfill the directives of the OSHA program.
5. Micro Air will guide you through this complicated issue to provide the most cost effective solution within your budget.

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