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COMBUSTIBLE DUST

INTRODUCTION

This document provides fundamental background information on the risks associated with the overall combustibility of dust. The risks and precautionary actions required are unique to the materials handled and processes used by individual facilities. It is the responsibility of the facility owner to identify and address any issues as well as ensure compliance with all applicable rules and regulations.

This bulletin provides a brief overview of the risks associated with combustible dust and methods of addressing that risk. It is not intended to provide advice or recommendations regarding a particular facility. This bulletin is not intended as a comprehensive source of information. In many cases, it is advisable to contract skilled professionals to characterize any hazards, design and install proper equipment and ensure compliance with local regulations.

OVERVIEW

There is a growing awareness of the hazards of combustible dust. Fine dusts of many materials such as metal, wood, coal, plastic, biosolids, sugar, flour, paper, soap, and textiles can be ignited under the proper conditions. In general, the finer the particle size, the more ignitable. Solid surface fabrication operations such as cutting, routing, drilling, and sanding or dust collection systems used to collect fabrication waste may create particles that are small enough to be combustible. Other materials, in particular wood products, used in the fabrication of solid surface or commonly used in facilities that fabrication also may contribute to the presence of combustible dust.

A combustible dust explosion requires five elements: the presence of combustible dust, an ignition source, oxygen, dispersion of the combustible dust in sufficient quantity, and confinement of the dust cloud. A significant risk associated with dust explosions is that a small primary explosion can create a shockwave that disturbs a dust layer in the facility. The dust may become airborne, triggering a second, much larger explosion. Housekeeping is a primary component of any combustible dust control program.

Combustible dusts may be handled safely, either by making the dust noncombustible or by use of proper equipment.

COMBUSTIBLE DUST SAFETY PROGRAM

Dust Hazard Assessment

The first step is understanding what risk is present. Each facility is unique in regard to design and dust characteristics. Dust combustibility can vary widely, even for the same material, as size, shape and moisture content are all important in addition to composition. Different processes create different dust size distributions. Even dust from a single process such as sanding can vary based on grade of sand paper. As each facility is unique, it is important that the dust be sampled appropriately and tested for each facility. There are companies that specialize in this field that can provide dust sampling, testing, and dust handling equipment.

The facility design and equipment also affect the risk as processes, areas where dust can build up, collection devices, potential ignition sources, etc. all vary widely.

Dust Control

Key elements of dust control include collection methods that either make the dust noncombustible (wet or inert addition) or include design elements to safely manage combustible dust. Dust collection systems can be local to the equipment or a central system for a facility. Proper engineering is critical to prevent explosions and to control explosive energy in the case of an explosion.

Housekeeping is a key element. An inspection process should be implemented to check all places dust may accumulate, including floors, equipment, lighting. rafters, etc. Even vertical surfaces may accumulate a dust layer. Hidden locations such as suspended ceilings must also be inspected. The guideline for dust thickness is no more than $^{1}/_{32}$" (0.8 mm). This is about the thickness of a paper clip or pencil lead.

A quick method of evaluation is surface appearance. If dust hides the color of an object, it is likely that the dust exceeds thickness guidelines.

Once it has been determined that dust is present, it must be removed in a safe manner. Avoid methods that disperse dust, such as high-pressure air, as they may create an ignitable dust cloud.

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Ignition Control

Proper equipment and processes must be installed to eliminate ignition sources. Class II wiring and equipment may be required. Open flames, smoking and sources of sparks must be controlled. Heated surfaces and heating systems are also a potential source of ignition.

Training

Train employees to recognize and prevent hazards associated with combustible dust. Conduct periodic refresher training. Reassess the training content if hazards or processes change.

Management

In addition to training in the recognition and prevention of combustible hazards, management should conduct a facilities analysis as well as develop and implement a prevention and protection program. As many facilities may not have the appropriate knowledge, it is often advisable to contract companies that specialize in combustible dust to perform hazard analyses and develop prevention and protection systems.

It is important that changes to products, equipment, personnel, and processes be managed so that any new or modified hazards are identified and addressed.

Retain all documentation regarding hazard analysis, training, equipment design, etc. Regulatory bodies and insurance companies may request this information.