

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 characterise 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 fabrication facilities 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 non-combustible or by use of proper equipment.

A. 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 specialise 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 non-combustible (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 United States guideline for dust thickness is no more than 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 colour 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.

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 recognise 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 specialise 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.

B. References

You may find the following publications helpful. These references are specific to United States and United Kingdom code requirements, but do include general information and guidance that may prove useful globally. It is important to understand and follow any local regulations.

OSHA Website, *Combustible Dust – An Explosive Hazard*, U. S. Department of Labor, Occupational Safety and Health Administration

<https://www.osha.gov/dsg/combustibledust/index.html>

OSHA Instruction CPL 03-00-008 *Combustible Dust National Emphasis Program (Reissued)*, U. S. Department of Labor, Occupational Safety and Health Administration, 2008
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=directives&p_id=3830

OSHA SHIB 07-31-2005 *Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosion*, U. S. Department of Labor, Occupational Safety and Health Administration, 2005
<https://www.osha.gov/dts/shib/shib073105.html>

OSHA 3371-08, *Hazard Communication Guidance for Combustible Dusts*, U. S. Department of Labor, Occupational Safety and Health Administration, 2009
<http://www.osha.gov/Publications/3371combustible-dust.html>

NFPA 654: *Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids*, National Fire Protection Association, 2013
<http://www.nfpa.org/codes-and-standards/documentinformation-pages?mode=code&code=654>

UK Health and Safety Executive HSG103, *Safe handling of combustible dusts: Precautions against explosions*
<http://www.hse.gov.uk/pubns/priced/hsg103.pdf>

The following references may apply as fabricators may process wood or metal, either as support structures or as separate product lines.

NFPA 664: *Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*, National Fire Protection Association, 2012
<http://www.nfpa.org/codes-and-standards/documentinformation-pages?mode=code&code=664>

NFPA 484: *Standard for Combustible Metals*, National Fire Protection Association, 2012
<http://www.nfpa.org/codes-and-standards/documentinformation-pages?mode=code&code=484>

PLEASE VISIT OUR WEB SITE: WWW.CORIAN.COM OR CONTACT YOUR CORIAN® REPRESENTATIVE FOR MORE INFORMATION ABOUT CORIAN® SOLID SURFACE.

This information is based on technical data that DuPont Specialty Products USA, LLC and its affiliates ("DuPont") believe to be reliable, and is intended for use by persons having technical skill and at their own discretion and risk. DuPont cannot and does not warrant that this information is absolutely current or accurate, although every effort is made to ensure that it is kept as current and accurate as possible. Because conditions of use are outside DuPont's control, DuPont makes no representations or warranties, express or implied, with respect to the information, or any part thereof, including any warranties of title, non-infringement of copyright or patent rights of others, merchantability, or fitness or suitability for any purpose and assumes no liability or responsibility for the accuracy, completeness, or usefulness of any information. This information should not be relied upon to create specifications, designs, or installation guidelines. The persons responsible for the use and handling of the product are responsible for ensuring the design, fabrication, or installation methods and process present no health or safety hazards. Do not attempt to perform specification, design, fabrication, or installation work without proper training or without the proper personal protection equipment. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents. DuPont shall have no liability for the use of or results obtained from such information, whether or not based on DuPont's negligence. DuPont shall not be liable for (i) any damages, including claims relating to the specification, design, fabrication, installation, or combination of this product with any other product(s), and (ii) special, direct, indirect or consequential damages. DuPont reserves the right to make changes to this information and to this disclaimer. DuPont encourages you to review this information and this disclaimer periodically for any updates or changes. Your continued access or use of this information shall be deemed your acceptance of this disclaimer and any changes and the reasonableness of these standards for notice of changes.

Copyright© 2019 DuPont Specialty Products USA, LLC. The Corian® Solid Surface Logo and Corian® are trademarks of DuPont Specialty Products USA, LLC or its affiliates. All rights reserved.