



Combustible Dust & SHARP

Danica Harrier, CSP
Consultation Program Manager &
Outreach Director





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-Overview





-Overview

-Methods for Reducing Risk





- Overview
- Methods for Reducing Risk
- OSHA and NFPA Standards





Combustible Dust

Overview



West Pharmaceutical Services - NC

6 killed
>12 injured
100's job losses





Malden Mills - MA

33 injured





Didion Milling, Inc. - WI

5 killed
14 injured

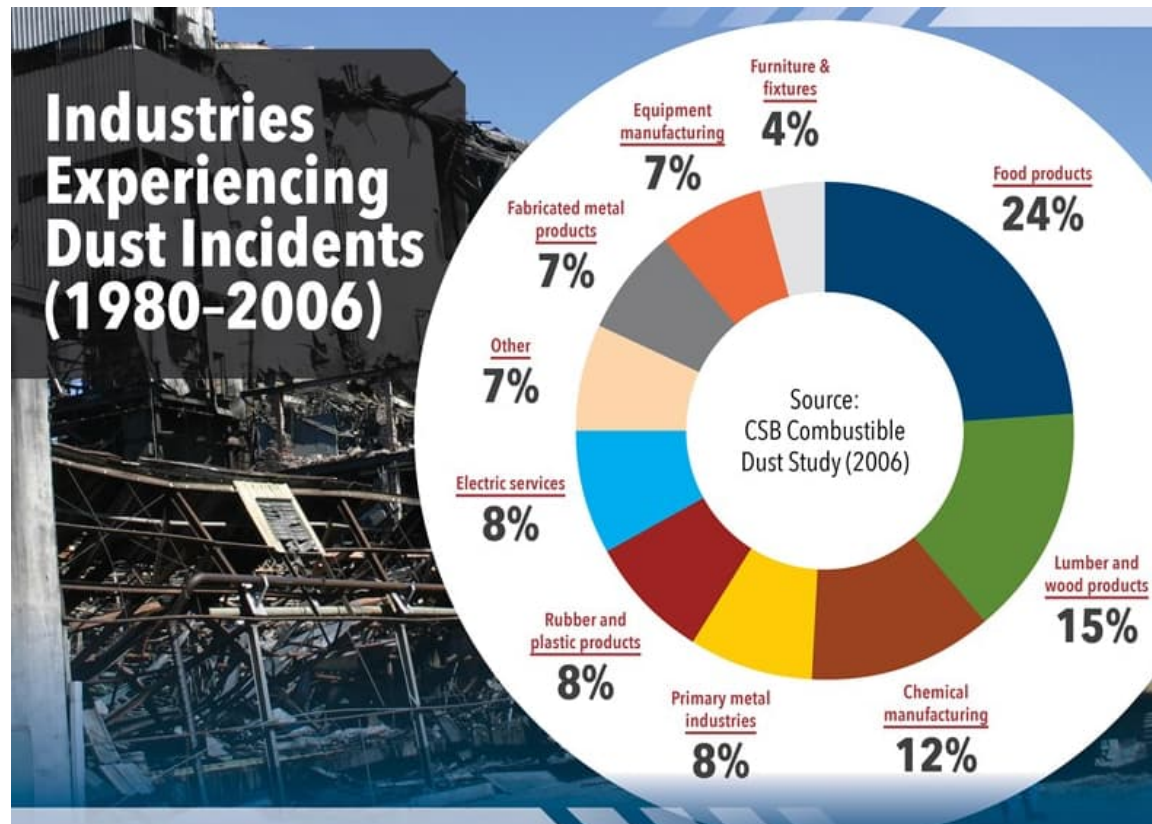




Imperial Sugar - GA

14 killed
38 injured







Combustible Dusts at Your Facilities?

Cellulose (Kst 229)

Whey (Kst 140)

Cornstarch (Kst 202)

Fiberglass (Kst 216)

Powdered Dye (Kst 364)

Wood (Kst 205)

Sugar (Kst 154)

Sand (Kst 0)

Magnesium (Kst 508)



Fire vs. Flash Fire vs. Explosion







Fire TRIANGLE





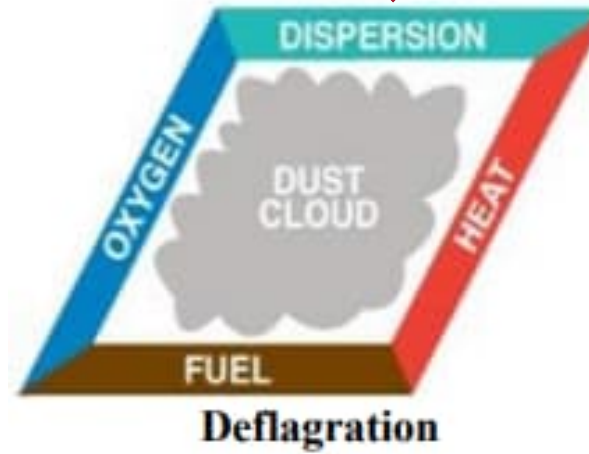


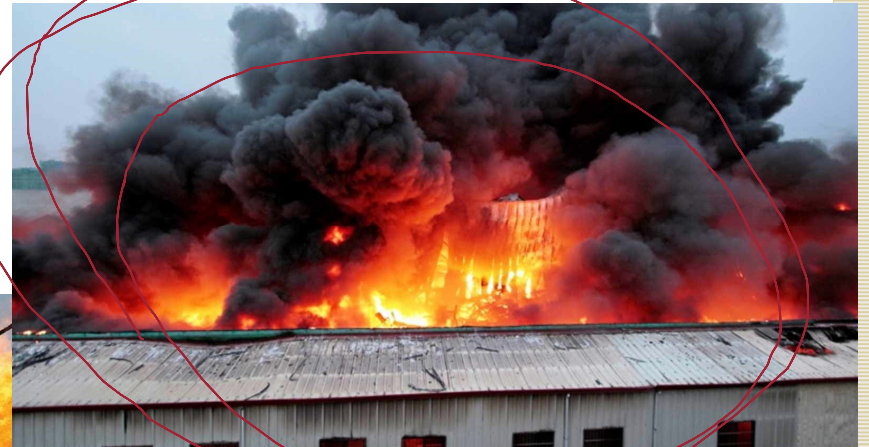


Video 0:41



Flash Fire







Combustible Dust PENTAGON



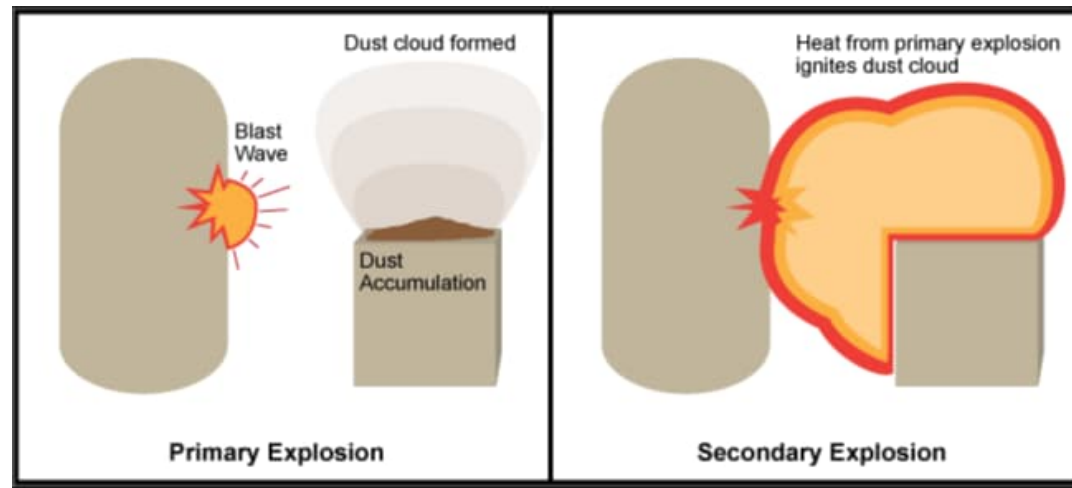


Scenario 1





Combustible Dust Explosion Behavior











❖ **Secondary dust explosions**, due to poor housekeeping and excessive dust accumulations, **caused most of the damage and casualties in recent catastrophic events.**



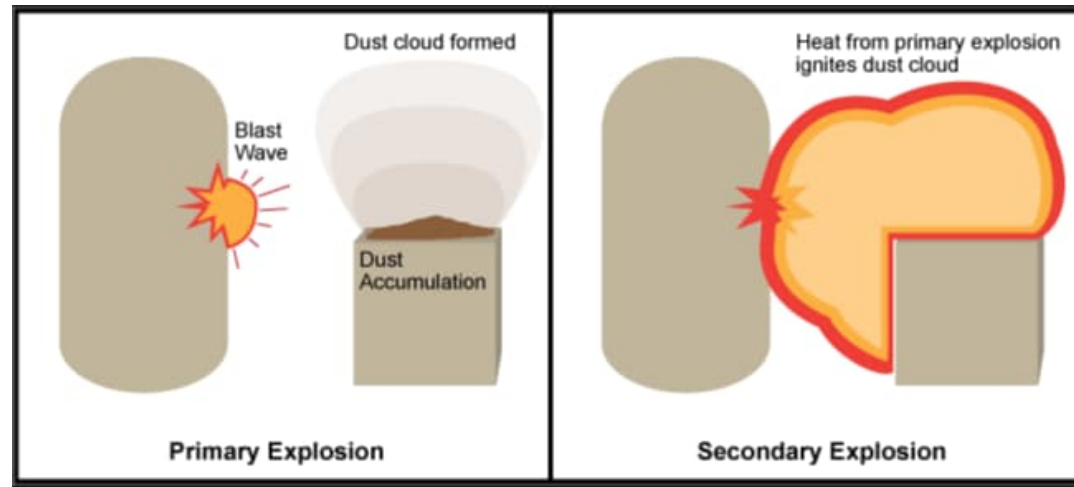
Strategies to Reduce Risk







Combustible Dust Explosion



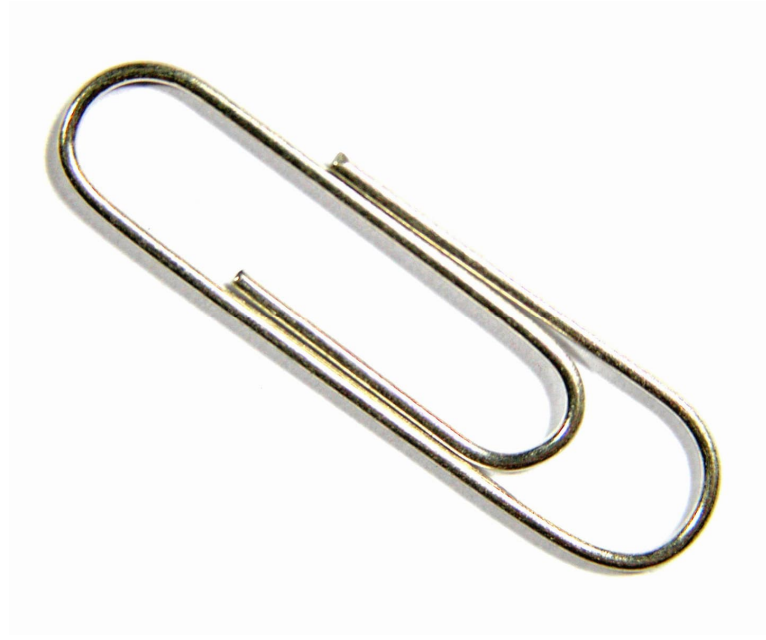


Housekeeping





Dust Layer $<1/32''$ Depth
 $<5\%$ Footprint Area or $<1000\text{sq. feet}$, whichever is
smaller







Where is dust escaping from?





Housekeeping





Tip: Imagine that dust is
A FLAMMABLE LIQUID







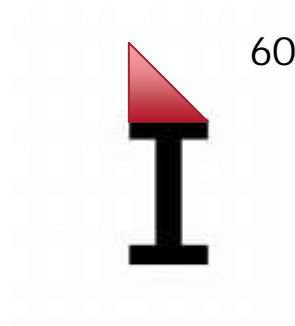
Tackle Fuel with DESIGN



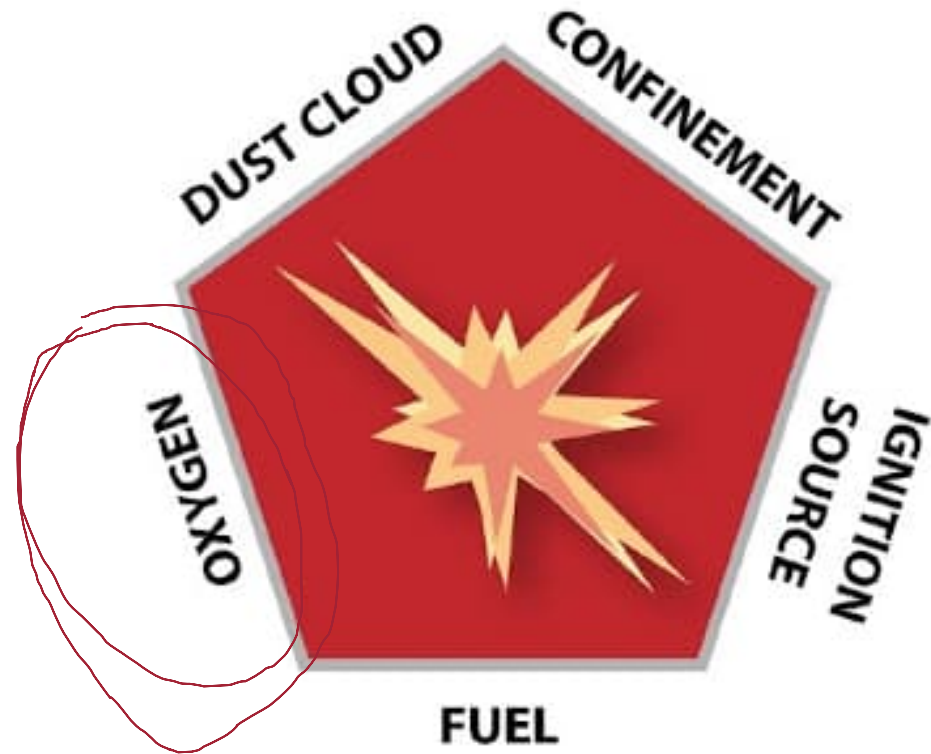
Local Exhaust Ventilation!



Design

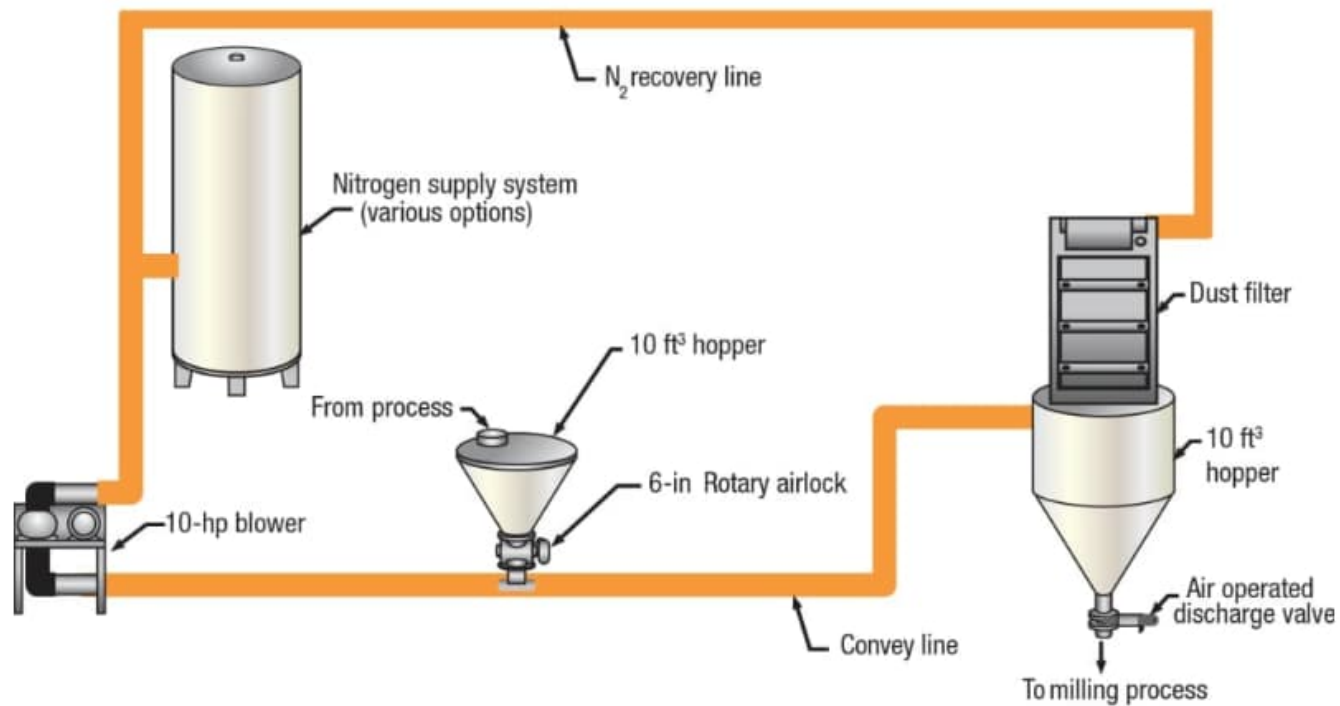


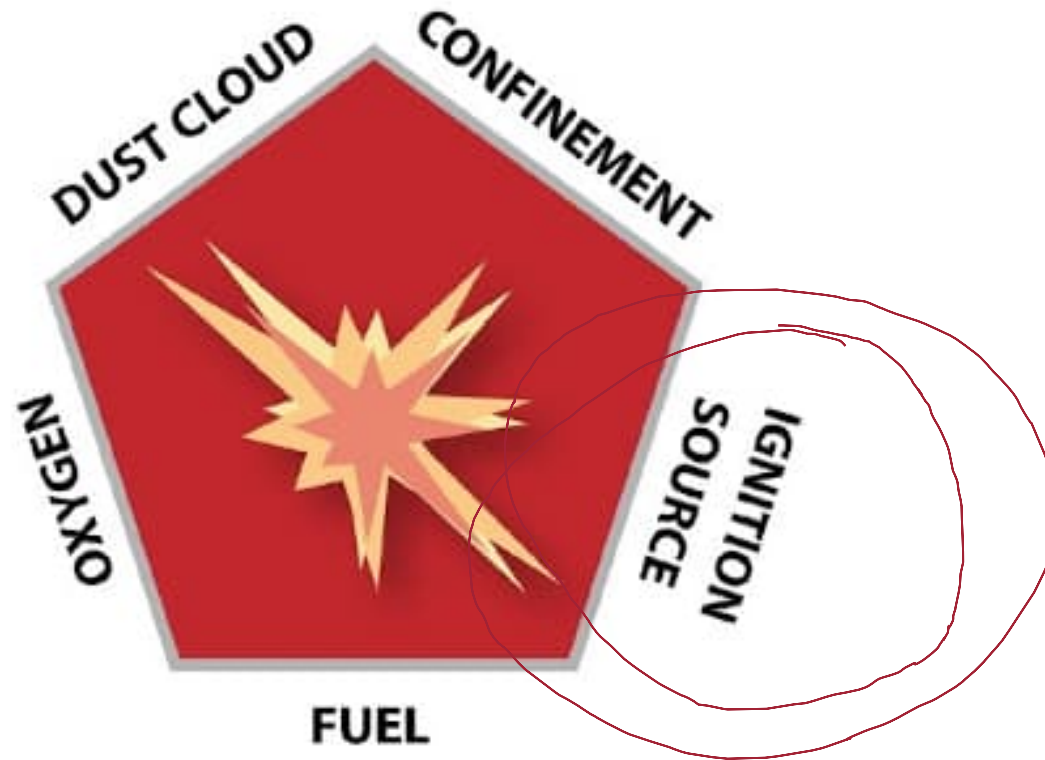
60° slope on horizontal surfaces





Reduce Oxygen w/ Inert Gas







Bond and Ground Equipment





Use Non-Sparking Tools





Preventative Maintenance

Eg. Lubrication of Bearings

Eg. Inspecting for Rust



Properly Rated PITs

Eg.
EX Rated PITs





HazLoc Electrical – Class II - Div 1 or 2



HazLoc Light



HazLoc Receptacle



Hot Work Permit System

- Combustible Materials removed before job begins
- Dust Removed from surfaces
- Dispersion eliminated before job begins
- Fire Watch



Vacuum Cleaners

Class II or III, Division 1 or HazLoc Fixed-pipe suction system



Class II Div 1 Vacuum





Avoid Compressed Air





Vacuuming preferred

*Sweeping and Water Wash-Downs





Dust clouds within Ducts, Mixers, Hoppers, Dryers?





Dispersion unavoidable...





Dispersion unavoidable...



Venting



Dispersion unavoidable...



Venting

Isolation



Dispersion unavoidable...



Venting

Isolation

Suppression



Venting - Explosion Doors/Panels





Venting - Abort Gates/Dampers





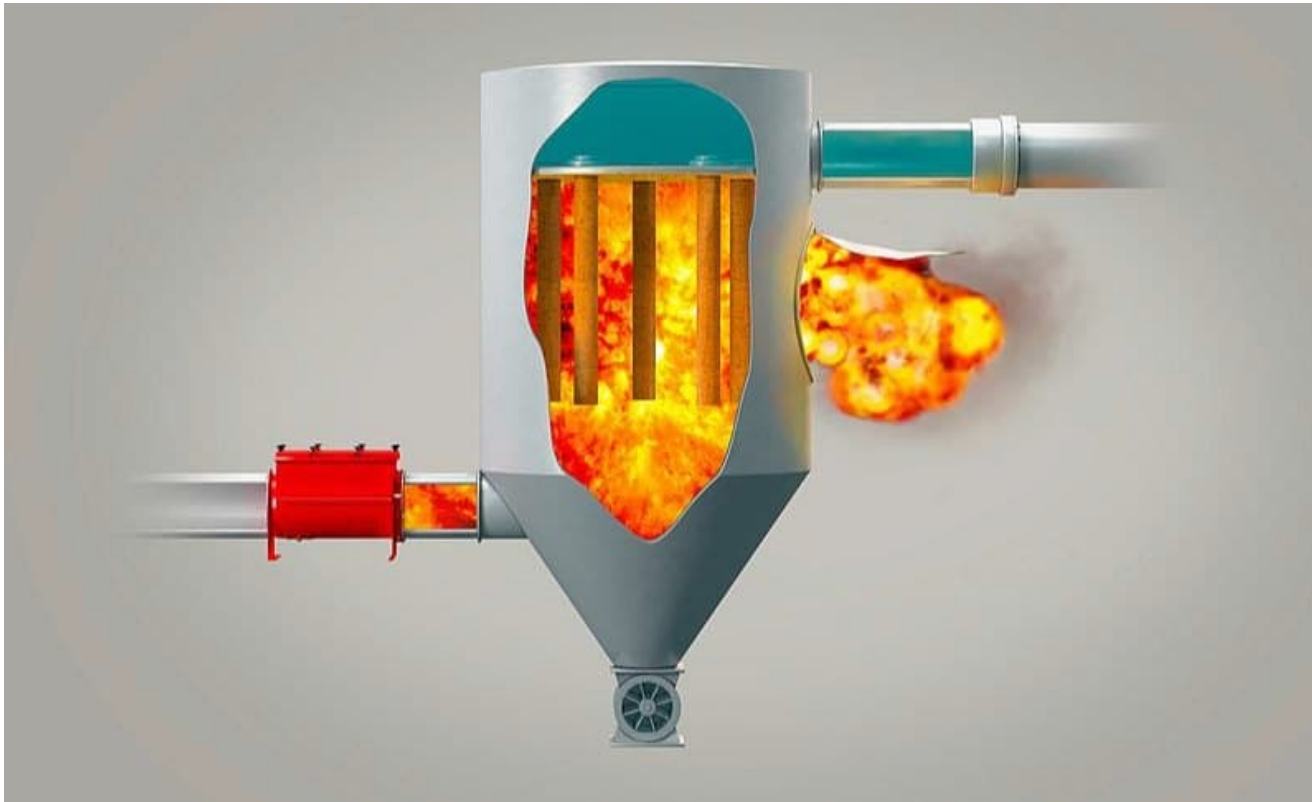
Venting - Abort Gates/Dampers

Video



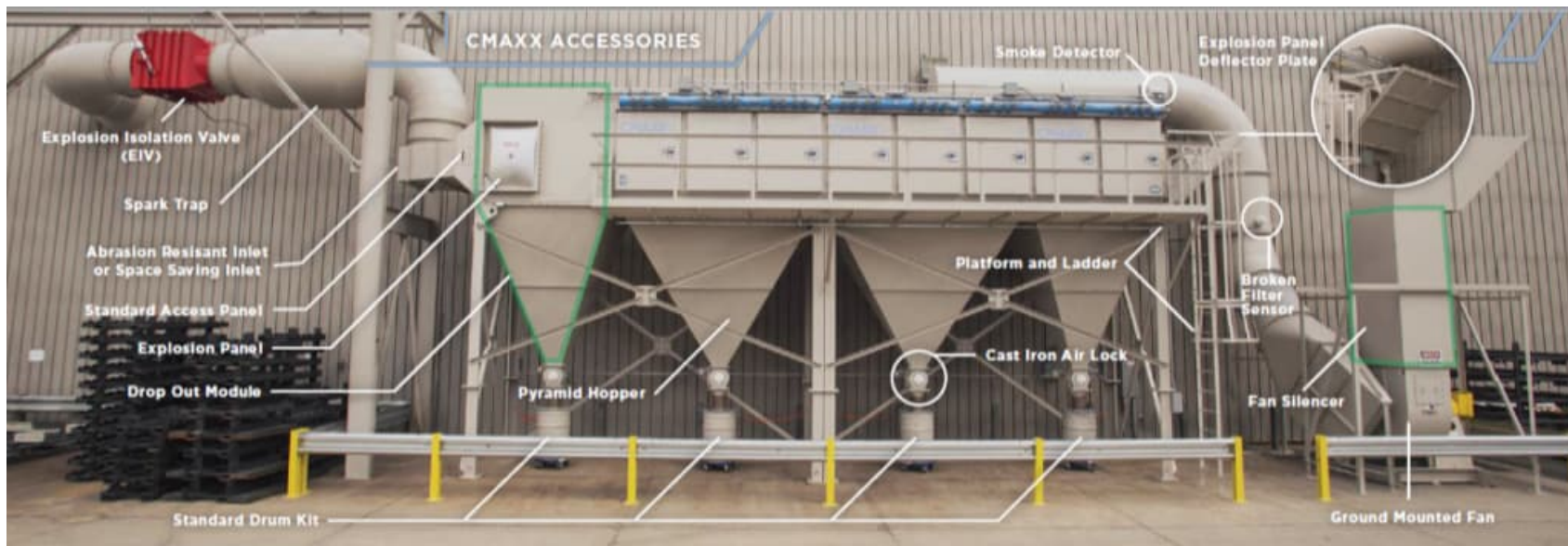


Isolation - Valves





Isolation Valve – Example 2





Suppression







Dispersion sometimes unavoidable...



Confinement is also sometimes unavoidable...





Venting - Explosion Doors/Panels





Venting - Abort Gates/Dampers





Explosion Containment



Image Courtesy of Glatt Air
Techniques; NFPA Standards

WisCon Program



Compressed Air
Vigorous Sweeping
Venting
Isolation
Suppression

Inert Gas



Venting
Isolation
Suppression

Housekeeping, Design

Bonding & Grounding
Non-Sparking Tools
Preventative Maintenance
HazLoc Electrical
HazLoc PITs
Hot Work Permits
HazLoc Vacuums



The design/installation of these controls must be performed by or overseen by a...

Qualified Person





The design/installation of these controls must be performed by or overseen by a...

Qualified Person

3.3.39 Qualified Person. A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems related to the subject matter, the work, or the project. [1451, 2018]



Many strategies to select from...

 Compressed Air
 Vigorous Sweeping
Venting
Isolation
Suppression

Inert Gas




Housekeeping, Design

Venting
Isolation
Suppression

Bonding & Grounding
Non-Sparking Tools
Preventative Maintenance
HazLoc Electrical
HazLoc PITs
Hot Work Permits
HazLoc Vacuums



Document fire, flash fire and explosion risks...

A large, black-outlined thought bubble with a 3D shadow effect, containing the text. Below it are two smaller circles, also with 3D shadows, connected by a line to the main bubble.

Document fire, flash fire and explosion risks...
Strategies in-place or in-progress



Dust Hazard Analysis



Dust Hazard Analysis (DHA)

- Documented evaluation of where fire, flash fire and explosion hazards exist within your facility



Dust Hazard Analysis (DHA)

- Documented evaluation of where fire, flash fire and explosion hazards exist within your facility
- Safeguards in-place to manage these events



Dust Hazard Analysis (DHA)

- Documented evaluation of where fire, flash fire and explosion hazards exist within your facility
- Safeguards in-place to manage these events
- Plan for implementation of additional safeguards, if warranted



Dust Hazard Analysis (DHA)

- Documented evaluation of where fire, flash fire and explosion hazards exist within your facility
- Safeguards in-place to manage these events
- Plan for implementation of additional safeguards, if warranted
- Housekeeping Tolerances (Routine and Non-Routine)



Revised every **5** years



The DHA must be completed by a...

Qualified Person



3.3.39 **Qualified Person.** A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems related to the subject matter, the work, or the project. [1451, 2018]



OSHA and NFPA Standards



OSHA

No combustible dust standard



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs

1910.307 HazLoc Electrical

CLASS	ZONE/DIVISION	DESCRIPTION	EXAMPLES
Class I (gases, vapours, and liquids)	Zone 0	Explosive gases or vapours are continuously present or present for long periods.	Inside tanks or pipes containing flammable liquids.
	Zone 1	Explosive gases or vapours are likely to occur under normal operating conditions.	Areas near valve glands, pump seals.
	Zone 2	Explosive gases or vapours are not likely to occur in normal operation. If they do occur, they exist only for a short period.	Surrounding tanks or vessels.
	Division 1	Explosive gases or vapours are present under normal conditions.	Petroleum refineries, chemical plants, gasoline storage areas.
	Division 2	Explosive gases or vapours are not likely to occur under normal conditions. If they do, it's for a short period.	Areas surrounding tanks or vessels in storage areas.
Class II (Dusts)	Division 1	Combustible dust is in suspension in the air under normal operating conditions, or could be, due to mechanical failure.	Grain handling, sugar production, woodworking.
	Division 2	Combustible dust is not normally in suspension in the air, but dust is sufficient to interfere with heat dissipation or ignitable by abnormal operation or equipment failure.	Storage areas for dust-producing materials.
Class III (Fibres and Flyings)	Division 1	Ignitable fibres, also called flyings, are present during normal operations.	Textile mills, woodworking, paper mills.

Source: E.B. Horsman & Sons –
Electrical Distributor



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs

1910.307 HazLoc Electrical

1910.252 or 254 Welding, Cutting, Brazing: Hot Work Permits

HOT WORK PERMIT

All temporary operations, outside of a designated fire safe area, involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to, brazing, cutting, grinding, soldering, thawing, and welding.

INSTRUCTIONS FOR PERMIT AUTHORIZED INDIVIDUAL (PAI)

A. Specify the precautions to take or do not proceed with the work.
B. Fill out and keep Part A during the hot work process.
C. Issue Part B to the person doing the job.
D. Final signoff is on Part B.

DATE _____ JOB NO. _____
LOCATION (WALLS & FLOOR) (in words) _____
DESCRIPTION OF WORK BEING PERFORMED _____
NAME OF PERSON DOING HOT WORK _____

The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED: _____ (Print Authorized Individual (PAI))
SIGNED: _____ (Person doing Hot Work)
SIGNED: _____ (Fire Watch)

TIME STARTED: Date: _____ Time: _____ AM/PM
PERMIT EXPIRES: Date: _____ Time: _____ AM/PM

PART A HOT WORK CHECKLIST

☐ Sprinklers and fire hoses in service/operable.
☐ Hot work equipment in good condition (e.g., power source, welding leads, torches, etc.).
☐ Multi-purpose fire extinguisher and/or water pump can.
☐ REQUIREMENTS WITHIN 35 FEET OF WORK:
☐ Dust, lint, debris, flammable liquids and oily deposits removed.
☐ Explosive atmosphere (if any) eliminated.
☐ Combustible items (e.g., wood, file, carpeting) wet down, covered with damp sand or fire blankets.
☐ Flammable and combustible material removed where possible. Otherwise protected with fire blankets, gloves, or metal shields.
☐ All wall and floor openings covered.
☐ Walkways protected beneath hot work.
☐ Protect or shut down ducts and conveyors that might carry sparks to distant combustibles.

WORK ON WALLS OR CEILINGS

☐ Combustibles moved away from other side of wall.

WORK IN CONFINED SPACES

☐ Confined space cleaned of all combustibles (except gas, oil, flammable vapors).
☐ Containers purged of flammable liquids/vapors.
☐ Company confined space guidelines followed.

FIRE WATCH/HOT WORK AREA MONITORING

☐ Fire watch will be provided during and after work, including any coffee or lunch break:
☐ 30 minutes ☐ 60 minutes ☐ Other _____
☐ Fire watch is supplied with an extinguisher and/or water pump can, also making use of other extinguishers located throughout work area.
☐ Fire watch is trained in use of fire equipment and familiar with location of nearest alarm.
☐ Fire watch is required for opposite side of wall, above, and below floors and ceilings.

☐ OTHER PRECAUTIONS TAKEN _____

FILL OUT EMERGENCY INFORMATION ON BACK OF FLY 2.



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs

1910.307 HazLoc Electrical

1910.252 or 254 Welding, Cutting, Brazing

1910.145 Signage





Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs

1910.307 HazLoc Electrical

1910.252 or 254 Welding, Cutting, Brazing: Hot Work Permits

1910.145 Signage

1910.1200 Training



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs

1910.307 HazLoc Electrical

1910.252 or 254 Welding, Cutting, Brazing: Hot Work Permits

1910.145 Signage

1910.1200 Training

1910.36-37 Means of Egress



Applicable OSHA Standards

1910.22 Walking-Working Surfaces (“Housekeeping”)

1910.178 PITs

1910.307 HazLoc Electrical

1910.252 or 254 Welding, Cutting, Brazing: Hot Work Permits

1910.145 Signage

1910.1200 Training

1910.36-37 Means of Egress

1910.132 PPE (*Video)







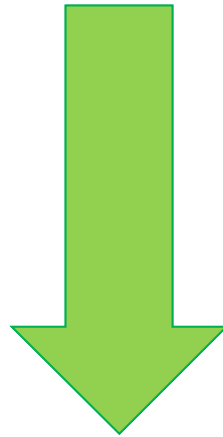
OSHA

No combustible dust standard – 5(a)(1) “General Duty Clause”



OSHA

No combustible dust standard – 5(a)(1) “General Duty Clause”



NFPA Standard(s)



NFPA 61 Agricultural and Food Processing Facilities

NFPA 654 Combustible Particulate Solids

NFPA 664 Wood Processing and Wood Working

NFPA 484 Combustible Metals

NFPA 652 Dust Hazard Analysis



NOTE:

NFPA 660 In-Development

It will consolidate these industry-specific standards.



NFPA Standards

www.nfpa.org

Membership \$175 per year (11/28/22)

PDF of a Standard: \$84 each (11/28/22)



OSHA Resources

Combustible Dust Landing Page:

[Combustible Dust: An Explosion Hazard - OSHA Guidance | Occupational Safety and Health Administration](#)

Combustible Dust Compliance Directive:

[CPL_03-00-008.pdf \(osha.gov\)](#)

Combustible Dust Technical Manual:

[OSHA Technical Manual - Section IV, Chapter 6, Combustible Dusts](#)



Combustible Dust & SHARP

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Consultation Program Manager and Outreach Director





What is SHARP?





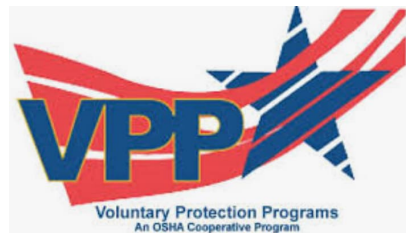
S.H.A.R.P.

Safety & Health Achievement Recognition Program



What is SHARP?

Large Businesses



Small Businesses





U.S. Department of Labor

Occupational Safety and Health Administration
Washington, D.C. 20210

Reply to the attention of:



MAR 20 2015

MEMORANDUM FOR: REGIONAL ADMINISTRATORS

THROUGH:

JORDAN BARAB
Deputy Assistant Secretary

DOROTHY DOUGHERTY
Deputy Assistant Secretary

FROM:

DOUGLAS J. KALINOWSKI, Director
Directorate of Cooperative and State Programs

SUBJECT:

Safety and Health Achievement Recognition Program: Revised
Updated Size Requirements

Requirements

The purpose of this memorandum is to update and clarify the Occupational Safety and Health Administration's (OSHA) policy regarding size requirements for companies participating in OSHA's Safety and Health Achievement Recognition Program (SHARP). This memorandum replaces the memorandum, "Safety and Health Achievement Recognition Program: Updated Size" issued on November 24, 2014, effective immediately.

Background

The OSHA On-site Consultation SHARP Program recognizes small employers who operate exemplary Safety and Health Management Systems (SHMS). Acceptance of a worksite into SHARP by OSHA, or a State Plan designee, is an achievement of status that singles out a company among its business peers as a model for worksite safety and health.

On November 24, 2014, OSHA issued a memorandum that emphasized that SHARP is intended for smaller businesses and re-established worksite and corporate size limits for participation in SHARP. The guidance in that memorandum was an extension of policy described in the Consultation Policies and Procedures Manual (CPPM) Ch. 8, Section II and stated:

The size requirements for employer participation in SHARP are: 250 or fewer onsite employees, and fewer than 500 corporate-wide employees. This upper corporate size



What Is SHARP?

- Prestigious Award



What Is SHARP?

- Prestigious Award
- Reserved for small businesses
 - Low injury and illness rates
 - Exemplary safety and health management systems in-place



What Is SHARP?

- Prestigious Award
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- The company is certified as “SHARP”



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 - Certificates last 1-3 years



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- The company is certified as “SHARP”
 - Certificates last 1-3 years
 - Companies can re-apply



What Is SHARP?

- Prestigious Award
- Reserved for small businesses
 - Low injury and illness rates
 - Exemplary safety and health management systems in-place
- The company is certified as “SHARP”
 - Certificates last 2-3 years
 - Companies can re-apply
 - We want companies to STAY SHARP



SHARP

We currently have 13 SHARP companies in Wisconsin.



Benefits of SHARP



Benefits of Participation

- Exempt from OSHA's programmed inspections



Benefits of Participation

- Exempt from OSHA's programmed inspections
- National exposure and recognition as an employer with an exemplary health and safety management system in-place

- 4 Occupational Health
 - ▷ WOHL
- 4 Free Safety & Health Consultation
 - WisCon Public Sector Consultation
 - Workplace COVID-19 Consulting
 - Visit Process
 - ▷ Monthly Webinars
 - Video Resources
 - Wisconsin SHARP Companies
 - Words of Wisdom Newsletter
 - ▷ Injury Statistics

Wisconsin SHARP Companies

The SHARP program is a recognition program for companies who have excellent health and safety program management systems in place.

To achieve SHARP status, a company must

1. Have a history of maintaining an injury and illness rate below the national average for its industry
2. Participate in a comprehensive consultation visit for both safety and health
3. Participate in a full evaluation of the health and safety management program in place for the company
4. Involve employees in the consultation and safety management processes
5. Correct all serious, other-than-serious, and regulatory hazards found
6. Have all basic elements for managing health and safety in place



SHARP Companies in Wisconsin:

- Avidity Science (formerly Edstrom Industries), Waterford, WI (since 2004) 2017 Recertification Story
- Epic Resins, Palmyra, WI (since 2022)
- Federal Tool and Engineering, LLC, West Bend, WI (since 2021)
- Mechanical Systems, Inc., 820 Progress Way, Sun Prairie, WI (since 2019)
- Mullins Cheese, Inc., Marshfield, WI (since 2022)
- Mullins Cheese, Inc., Mosinee, WI (since 2022)
- Peragon Enterprises, Inc., W7041 Woodcraft Rd, Shell Lake, WI (since 2020)
- Radius Packaging, Delavan, WI (since 2023)
- Radius Packaging (formerly Schoeneck Containers, Inc.), New Berlin, WI (since 2004) OSHA Small Business Success Story
- Rehrig Pacific Company, Pleasant Prairie, WI (since 2006)
- Scot Forge, Inc., Clinton, WI (since 2006)
- The Legacy at St. Joseph's Kenosha, WI (since 2013)
- VerHalen, Inc., Green Bay, WI (since 2022)





Company Name	City
Avidity Science, LLC	Waterford
Epic Resins	Palmyra
Federal Tool and Engineering, LLC	West Bend
Mechanical Systems, Inc.	Sun Prairie
Mullins Cheese	Mosinee
Mullins Cheese, Inc.	Marshfield
Peragon Enterprises, Inc. - Shell Lake	Shell Lake
Radius Packaging	New Berlin
Radius Packaging	Delavan
Rehrig Pacific Company	Pleasant Prairie
Scot Forge, Inc.	Clinton
The Legacy at St. Joseph's	Kenosha
VerHalen, Inc.	Green Bay



Benefits of Participation

- Exempt from OSHA's programmed inspections
- National exposure and recognition as an employer with an exemplary health and safety management system in-place
- Plaque and signed certificate from OSHA



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- Plaque and signed certificate from OSHA
- Use of SHARP logo





Benefits of Participation

- Exempt from OSHA's programmed inspections
- National exposure and recognition as an employer with an exemplary health and safety management system in-place
- Plaque and signed certificate from OSHA
- Use of SHARP logo
- **Significant management system improvements**



Interested?



E-mail me!

-Most Recent “Complete” 300A Form (2023)





Thank you!!!



THE UNIVERSITY
of
WISCONSIN
MADISON

Danica Harrier, CSP
Program Manager & Outreach Director



On-Site Safety and Health Consultation Program

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