

# Training on Prevention of Grain Dust Explosion

Date: \_\_\_\_\_

Place: \_\_\_\_\_

Name & Title	Company & Address	Phone & E-mail

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<b>Signature of Grantee:</b> <b>Facilitator:</b>	<b>Date:</b>
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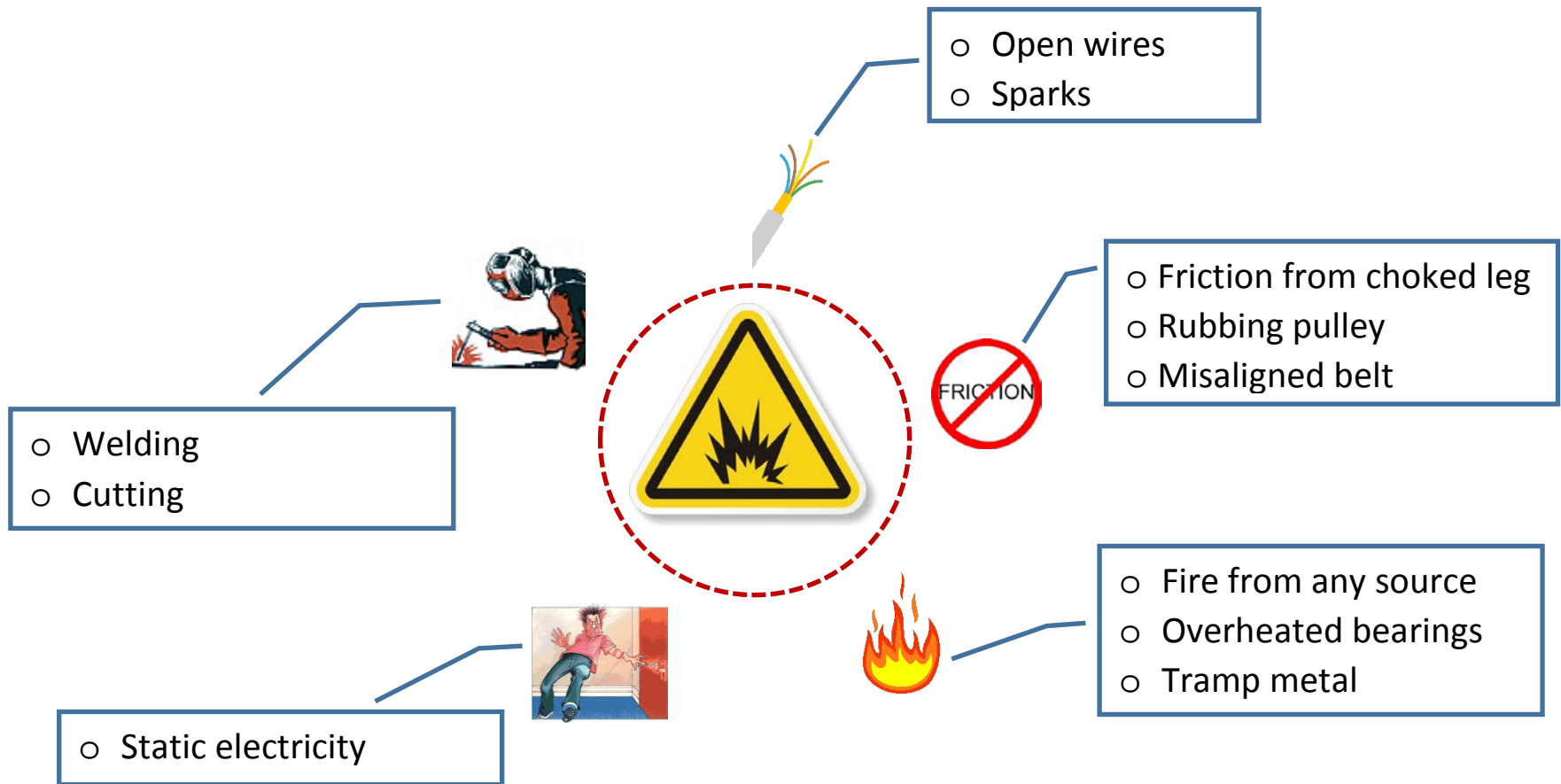
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# Potential Ignition Sources



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## Pre Knowledge Survey

1. Which of the following is not an element needed for a grain dust explosion:
  - a. Oxygen
  - b. Saturation
  - c. Ignition Source
  - d. Dispersion
  - e. Confinement
  
2. T/F Pressures from an explosion with corn dust can be greater than 100 psig.
  
3. Good housekeeping includes:
  - a. Vacuuming with proper equipment
  - b. Paying attention to "hidden areas"
  - c. Training all employees
  - d. Maintaining dust aspiration systems
  - e. All of the above
  
4. T/F Deflagration isolation is an option for dust explosion protection.
  
5. Which of the following are ways to reduce grain dust during unloading:
  - a. Use cyclones, fabric filters, baffles, and deadboxes
  - b. There is no good way to reduce dust during unloading
  - c. A closed receiving area so the wind can't disturb the dust
  - d. Unload the grain slowly
  
6. T/F The recommended minimum spout slope for free flowing ingredients is 30 degrees.
  
7. Safety precautions for bucket elevators include:
  - a. Locating the bucket elevator inside the main structure
  - b. Dust tight with no venting to prohibit escape of dust
  - c. Belt speed, alignment and bearing temperature sensors
  - d. Explosion venting secured tightly to the leg
  
8. Suppression systems have to be inspected at minimum every:
  - a. Month
  - b. 2 months
  - c. 3 months
  - d. 12 months
  
9. T/F Chemical isolation systems do not trigger with pressure.
  
10. Explosion Suppression systems can suppress an explosion within:
  - a. 20 milliseconds
  - b. 40 milliseconds
  - c. 80 milliseconds
  - d. 120 milliseconds

## Pre Knowledge Survey

1. Which of the following is not an element needed for a grain dust explosion:
  - a. Oxygen
  - b. Saturation
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  - e. Confinement
2. T/F Pressures from an explosion with corn dust can be greater than 100 psig.
3. Good housekeeping includes:
  - a. Vacuuming with proper equipment
  - b. Paying attention to "hidden areas"
  - c. Training all employees
  - d. Maintaining dust aspiration systems
  - e. All of the above
4. T/F Deflagration isolation is an option for dust explosion protection.
5. Which of the following are ways to reduce grain dust during unloading:
  - a. Use cyclones, fabric filters, baffles, and deadboxes
  - b. There is no good way to reduce dust during unloading
  - c. A closed receiving area so the wind can't disturb the dust
  - d. Unload the grain slowly
6. T/F The recommended minimum spout slope for free flowing ingredients is 30 degrees.
7. Safety precautions for bucket elevators include:
  - a. Locating the bucket elevator inside the main structure
  - b. Dust tight with no venting to prohibit escape of dust
  - c. Belt speed, alignment and bearing temperature sensors
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8. Suppression systems have to be inspected at minimum every:
  - a. Month
  - b. 2 months
  - c. 3 months
  - d. 12 months
9. T/F Chemical isolation systems do not trigger with pressure.
10. Explosion Suppression systems can suppress an explosion within:
  - a. 20 seconds
  - b. 40 seconds
  - c. 80 seconds
  - d. 120 seconds

## Post Knowledge Survey

1. T/F The five elements of the explosion pentagon are confinement, saturation, oxygen, dust, and ignition.
2. Pressures from an explosion with corn dust can be greater than \_\_\_\_\_ psig:
  - a. 25 psi
  - b. 6 psi
  - c. 100 psi
  - d. 35 psi
3. T/F: Dust aspiration systems are an example of a good housekeeping practice.
4. Well-designed spouts include:
  - a. Openings to vent dust
  - b. A slope of 30 degrees for free flowing grain
  - c. Replaceable liner material
  - d. A narrow diameter to increase speed
5. Avoid grain turbulence at grain transfer points by:
  - a. Unloading grain very slowly
  - b. Using a baffle or other strategy to direct the grain flow
  - c. Unloading grain inside a closed building
  - d. Turning off any dust collection system to not lose any material
6. T/F: Bucket elevators must have explosion relief panels on outside legs.
7. Dust explosion protection options include:
  - a. Containment
  - b. Deflagration Venting
  - c. Suppression
  - d. Deflagration isolation
  - e. All of the above
8. T/F: Explosion suppression systems can suppress an explosion within 8 milliseconds.
9. T/F: Mechanical isolation systems use fast acting valves to contain the flames.
10. T/F: Suppression systems must be inspected every 3 months.

## Post Knowledge Survey

1. **T/F** The five elements of the explosion pentagon are confinement, saturation, oxygen, dust, and ignition.
2. Pressures from an explosion with corn dust can be greater than \_\_\_\_\_ psig:
  - a. 25 psi
  - b. 6 psi
  - c. 100 psi**
  - d. 35 psi
3. **T/F** Good housekeeping practices include maintaining dust aspiration systems.
4. Well-designed spouts include:
  - a. Openings to vent dust
  - b. A slope of 30 degrees for free flowing grain
  - c. Replaceable liner material**
  - d. A narrow diameter to increase speed
5. Avoid grain turbulence at grain transfer points by:
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6. **T/F** Bucket elevators must have explosion relief panels on outside legs.
7. Dust explosion protection options include:
  - a. Containment
  - b. Deflagration Venting
  - c. Suppression
  - d. Deflagration isolation
  - e. All of the above**
8. **T/F** Explosion Suppression systems can suppress an explosion within 80 seconds
9. **T/F** Mechanical isolation systems use fast acting valves to contain the flames
10. **T/F** Suppression systems have to be inspected every 3 months

## Prevention of Grain Dust Explosion

Date: \_\_\_\_\_

Place: \_\_\_\_\_

Please complete this evaluation at the conclusion of the workshop. It is important to complete this in detail and to be frank in your observations. As trainer, we are always seeking ways to improve our training design and delivery.

<b>Please rate your level of agreement on whether the learning outcomes for the training were attained.</b>					
<b>5 – strongly agree; 4 – agree; 3 – neither agree nor disagree; 2 – disagree; 1 – disagree strongly</b>					
1. I am better aware of the causes of grain dust explosions.	5	4	3	2	1
2. Group discussion will help me apply the information to my facility.	5	4	3	2	1
3. I play an important role in my facility housekeeping.	5	4	3	2	1
4. The workshop presented advanced ideas for mitigating grain dust explosions	5	4	3	2	1
5. Information on explosion safeguards increased my awareness to be better equipped and prepared.	5	4	3	2	1
6. The equipment hands-on evaluation time helped me better understand the equipment.	5	4	3	2	1
7. Training content was valuable.	5	4	3	2	1
8. I will use the knowledge gained in my work.	5	4	3	2	1
9. Training format was effective (small group, lecture, etc.)	5	4	3	2	1
10. Training materials were helpful.	5	4	3	2	1

**Please turn over**



11. Instructors were knowledgeable about topic.	5	4	3	2	1
12. Instructor presentation style was effective.	5	4	3	2	1
13. Instructor involved participants in learning activities.	5	4	3	2	1
14. The room and amenities were conducive to learning (if applicable).	5	4	3	2	1
15. The workshop location was appropriate.	5	4	3	2	1
17. What was the most valuable thing you learned and why?					
18. What was of least value to you and why?					
19. Additional Comments:					