



Training Solutions, Delivered!

GRINDING AND ABRASIVE WHEELS: *Safe Operation*

**Leader's Guide, Fact Sheet
& Quiz**

**Item Number: 5085
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This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation.

PREPARING FOR THE MEETING

Here are a few suggestions for using this program:

- a) Review the contents of the Fact Sheet that immediately follows this page to familiarize yourself with the program topic and the training points discussed in the program. The Fact Sheet also includes a list of Program Objectives that details the information that participants should learn from watching the program.
- b) If required by your organization, make an attendance record to be signed by each participant to document the training to be conducted.
- c) Prepare the area and equipment to be used for the training. Make sure the watching environment is comfortable and free from outside distractions. Also, ensure that participants can see and hear the TV screen or computer monitor without obstructions.
- d) Make copies of the Review Quiz included at the end of this Leader's Guide to be completed by participants at the conclusion of the presentation. Be aware that the page containing the answers to the quiz comes before the quiz itself, which is on the final page.

CONDUCTING THE PRESENTATION

- a) Begin the meeting by welcoming the participants. Introduce yourself and give each person an opportunity to become acquainted if there are new people joining the training session.
- b) Introduce the program by its title and explain to participants what they are expected to learn as stated in the Program Objectives of the Fact Sheet.
- c) Play the program without interruption. Upon completion, lead discussions about your organization's specific policies regarding the subject matter. Make sure to note any unique hazards associated with the program's topic that participants may encounter while performing their job duties at your facility.
- d) Hand out copies of the review quiz to all of the participants and make sure each one completes it before concluding the training session.

5085 GRINDING AND ABRASIVE WHEELS:

Safe Operation FACT SHEET

LENGTH: 10 MINUTES

PROGRAM SYNOPSIS:

Grinders with abrasive wheels are common on many jobsites. These amazing tools can help you with a variety of tasks, but to do so safely, you must be knowledgeable and competent before operating any machinery. The risk of breakage is inherent in every abrasive wheel. Statistics show that nearly half of all accidents involving abrasive wheels are due to an unsafe system of work or operator error. That's what this program is all about: how to operate an abrasive grinder safely without incident.

Topics include abrasive wheel hazards, PPE, grinder inspection, work rests and tongue guards, dangers of operating in overspeed conditions, grinding wheel inspection, fire prevention and preventing slips, trips and falls.

PROGRAM OBJECTIVES:

After watching the program, the participant will be able to explain the following:

- Which hazards are presented by abrasive wheels;
- Which PPE to wear and not to wear when using grinders;
- What to look for when inspecting grinders and abrasive wheels;
- What distances must be maintained for work rests and tongue guards from abrasive wheels;
- Why overspeed conditions are so dangerous and which unsafe actions can lead to them;
- How to prevent fires and slip, trips and falls during grinder operation.

INSTRUCTIONAL CONTENT:

ABRASIVE WHEEL HAZARDS

- Abrasive wheels can be mounted to a bench or a pedestal and also come in a portable version as well. Each variation presents its own safety concerns, but they also share many of the same hazards as well.
- One of the most common injuries are lacerations from objects flying off the wheel or coming into contact with the wheel directly. When foreign objects are sent off as a projectile from the wheel, it will cause an injury to any area that impacts the body.
- A wheel explosion happens when an object becomes lodged between the wheel and the guard, causing the wheel to explode into little pieces. In turn, projectiles are sent off at high speeds, causing injury.
- You should never operate a grinder until you have been trained and your company approves you to work with abrasive wheel grinders.

PPE

- Typically, you never want to use gloves while using a grinder as a glove can get caught in the wheel, doing you more harm than good.
- There are some tasks where gloves may be necessary. If this is the case, then you must take extra precautions to be sure your glove does not come into contact with the wheel.
- Unless otherwise informed by your supervisor, do not wear gloves when operating a grinder.
- You should always wear safety glasses when operating a grinder. These safety glasses should have side shields in place to help reduce the chance of an object coming into contact with your eye.
- On top of this, you should be wearing a face shield to help protect the rest of your face. As you can see, it is easy to send debris flying towards your face; make sure it's protected.

GRINDER INSPECTION

- You should inspect any and all tools before turning on. This includes an abrasive wheel grinder.
- First, check the power cord. Make sure there are no cuts or cracks in wire housing.

- How are the prongs? Intact and secure? Never operate a tool with a missing ground plug.
- If you are using a permanently mounted grinder, make sure it is secured to the surface or pedestal. Using a grinder that is not securely mounted is asking for trouble.
- Next, let's look at the spindle. Does it look secure? Are the guards in place? The guard should cover at least 75 percent of the wheel diameter.
- Never operate a machine if it has been altered in any way, unless approved by the manufacturer.

WORK RESTS & TONGUE GUARDS

- The work rest is meant to help you brace whatever it is that you are grinding. These work rests must be kept within one-eighth inch of the wheel.
- As you use the grinder, the wheel will slowly deteriorate, losing size. When the size is greater than one-eighth inch, you must adjust the work rest back within perimeters.
- You might be wondering why so small of a gap. This is to help prevent any items from becoming lodged between the abrasive wheel and work rest, which could cause a wheel explosion.
- There is also an adjustable tongue guard on the top, which must be kept within one-quarter inch of the wheel. Just like the work rest, you will need to make adjustments based off the use and wear of the abrasive wheel.

DANGERS OF OPERATING IN OVERSPEED CONDITION

- The abrasive wheel can be replaced and you will have to do so at some point or another.
- You must make sure that the abrasive wheel max RPM matches or is greater than the RPM of the grinder motor. This is a potential source of serious injury when operating the wheel in an overspeed condition.
- While a wheel that is run far enough in excess of its rated maximum speed may shatter within minutes of operation, danger may also result from a wheel run just slightly faster than its rated speed. This less severe overspeed condition can cause the wheel to be damaged and the damage may result in breakage after further use.
- For example, operating a reinforced, nine-inch diameter wheel rated for a maximum speed of 6,600 RPM on a seven-inch angle grinder with a speed of 7,700 RPM can cause the wheel to crack. This cracking can lead to breakage later.
- The following actions, all of which are not recommended, can also lead to an overspeed condition:
 - Mounting the grinding wheel on a sander, such as a "pistol-grip" air sander;
 - Mounting the wheel directly on an electric motor; mounting the wheel on the wrong machine size for that wheel;
 - Failing to properly maintain machine components, particularly governors on pneumatic machines and linkages on floor stand machines;
 - Using the incorrect air, hydraulic or electric power supply;
 - Using an improper speed setting on the machine.
- Any of these actions sets up a disastrous scenario that could lead to an accident involving serious injury or death. In short, never overspeed a grinding wheel.
- The speed of the grinder must be compared to the speed marked on the wheel or package to make sure the machine speed is at or below the maximum operating speed of the wheel. Surpassing this rating not just risks wheel breakage, but also the safety of shop personnel.

GRINDING WHEEL INSPECTION & MOUNTING

- Grinding wheels must be inspected and ring tested before they are mounted to ensure that they are free from cracks or other defects.
- Wheels should be tapped gently with a light, nonmetallic instrument. A stable and undamaged wheel will give a clear metallic tone or ring. That distinctive ring comes from the hardness of the metal of the wheel and its ability to transmit sound vibrations.
- If the wheel is cracked, the vibrations stop at the crack and there is no ring; however, a ring test may not detect all defects in a wheel, so a careful visual inspection is also necessary.
- Before mounting the wheel, check the machine's spindle speed to ensure that it does not exceed the maximum operating speed marked on the wheel.
- After mounting the wheel, stand to the side of the machine when powering it on in case a crack or defect was not detected.

FIRE PREVENTION

- Grinders produce sparks and that means they present a potential fire hazard. A simple act of grinding can and has caused devastating fires in the past; therefore, never store any flammable or combustible materials near any area where you will be grinding. If flammable or combustible material is already there, move it or clean it up before starting work.
- Some jobs may require a hot work permit for grinder use; check to see before you begin this or any other hot work.
- Also, a fire extinguisher should be available nearby any time hot work is being performed.
- Just remember, grinders make sparks, sparks make fires, so be careful when you use a grinder for anything.

PREVENTING SLIPS, TRIPS & FALLS

- Slips, trips and falls are another hazard you must watch out for when operating a grinder. The dust and debris caused from grinding can make for a very slippery floor surface.
- This is why it is important to apply good housekeeping skills when using this machine to avoid a potential fall. A simple sweep could have been done to prevent this fall.
- You should never grind aluminum or any other soft metal on a grinder. This will clog up the pores on the abrasive wheel and as the wheel heats up, it can explode.

GRINDING & ABRASIVE WHEELS:
Safe Operation

ANSWERS TO THE REVIEW QUIZ

1. c
2. d
3. b
4. b
5. a
6. a
7. a
8. c
9. a
10. b

GRINDING & ABRASIVE WHEELS: Safe Operation
REVIEW QUIZ

The following questions are provided to determine how well you understand the information presented in this program.

Name _____ Date _____

1. What type of PPE should you NOT wear when operating a grinder?
 - a. Safety Glasses
 - b. Face Shield
 - c. Gloves
 - d. None of the above
2. How often should you inspect your grinder?
 - a. Daily
 - b. Weekly
 - c. Yearly
 - d. Before each use
3. Guards may be removed from grinders to improve access to the work.
 - a. True
 - b. False
4. On a bench grinder what is the maximum distance the tool rest may safely be away from the grinding wheel?
 - a. 1/16 inch
 - b. 1/8 inch
 - c. 1/4 inch
 - d. 1/2 inch
5. You should never store any flammable or combustible materials near any area where you will be grinding.
 - a. True
 - b. False
6. A ring test should be performed before installing any grinding wheel.
 - a. True
 - b. False
7. Grinding wheels can explode and cause great bodily injury.
 - a. True
 - b. False
8. The guard on a grinding wheel should cover at least _____ percent of the wheel diameter.
 - a. 50
 - b. 65
 - c. 75
9. Grinding operations may cause a slip and fall hazard due to the debris from the grinding operation.
 - a. True
 - b. False
10. Grinding aluminum or other soft metal can help unclog pores on your grinding wheel.
 - a. True
 - b. False