

# **Safeguarding Machinery and Equipment**

## ***General Requirements***

**Some Common  
Safeguarding Applications:**

**Abrasive equipment**



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The OHSR requires that abrasive wheels and grinders be used according to the requirements of *ANSI Standard B7.1, The Use, Care and Protection of Abrasive Wheels*. This section highlights the more important safety measures contained in the standard, but is not intended to take the place of a thorough knowledge of the standard, especially for employers and workers involved in high-risk grinding operations.

An abrasive tool uses an abrasive wheel to wear away the surface of a workpiece to change its shape. An abrasive wheel consists of a bonded abrasive material with properties specific to the material being worked; for example, a wheel intended for ferrous material may not be suitable for grinding nonferrous material. There are three common types of grinding machines: bench grinders, pedestal grinders, and portable grinders.

The greatest risk associated with abrasive equipment is **fragmentation** of an abrasive wheel. The size and peripheral speed of the wheel determine the amount of energy that will be released in the event of a failure. The main objective of safeguarding is to contain pieces of the abrasive wheel if a rupture occurs.

There are two important areas where training and safeguarding will prevent serious injury and death:

- Proper storage and handling of abrasive wheels
- Appropriate safeguarding of stationary and portable grinders

#### **Proper storage and handling of abrasive wheels**

Wheels (especially vitrified or glass-based wheels) are easily damaged if they are bumped or dropped. That is why it is so important to store and handle them carefully.

- Check all wheels when you receive them and before using them.
- Follow the manufacturer's instructions for storage. Proper sorting and storage of grinding wheels will help ensure easy access, less handling, and less chance of error.
- Store grinding wheels in an area that is dry and protected against damage from impact, solvents, high humidity, and extreme heat or cold.
- Store portable grinders on hooks or in V-shaped racks. Protect racks from damage.
- Arrange grinding wheels so that older ones will be chosen before newer ones.
- Never roll a wheel on its edge; it may absorb oil or dirt from the floor, and get damaged.

## Design criteria for abrasive wheel guards

Figure 4.11 illustrates the maximum wheel exposures for guards on two types of abrasive equipment: bench and pedestal grinders (90° exposure) and hand-held angle grinders (180° exposure). When a portable grinder is being used for grinding root passes in welded pipe, the protective hood must cover at least 120° of the wheel periphery and the operator must wear adequate eye and face protection.

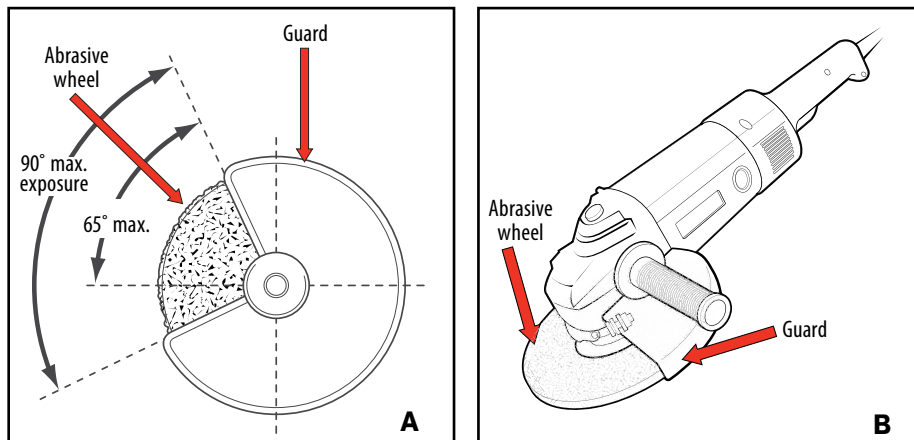


Figure 4.11. Maximum wheel exposures for different types of abrasive wheel guards.

## Safe work procedures for bench and pedestal grinders

- Pedestal grinders must be securely attached to the floor. Bench grinders should be securely fastened to a bench.
- Always check that the rated RPM (revolutions per minute) of the grinding wheel is consistent with the rotational speed of the grinding machine.
- Always wear eye protection (safety glasses or impact-rated face shield).
- Never remove wheel guards from a bench/pedestal grinder. They offer protection in case of wheel failure, and protect hands and fingers from injury.
- Work rests or tools rests must be provided on all machines. The work rest must be securely fixed and adjusted close to the grinding wheel (maximum distance of 3 mm [ $\frac{1}{8}$  inch]). It should be adjusted as the disc becomes smaller through wear and dressing. Never adjust tool rests while the grinder is running.
- Before commencing grinding, allow the grinding wheel to run at operating speed for at least one minute. Do not stand directly in front of a grinding wheel when it is first started. Do not use a wheel that vibrates.

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- When starting a grinding operation, bring the object into contact with the grinding wheel slowly and smoothly. Avoid impact or bumping motions.
  - Move the work piece back and forth across the face of the wheel. This prevents “ruts” or grooves from forming.
  - Occasionally a new wheel may be cracked or flawed and is likely to shatter as soon as it is used. New wheels should be visually checked and given a “ring” test before being fixed to the spindle. Tap the side of the wheel with a light tool. It should have a clear ring. A dull noise indicates a flaw.
  - Ensure that the hole in the grinding wheel fits closely on the spindle.
  - When a wheel has been newly fitted, rotate it by hand to check the balance before switching on power to the machine.
  - An abrasive wheel can crack and shatter if flanges and blotters are not evenly seated on either side of the wheel before the locking nut is tightened. Avoid overtightening the locking nut, as this can exert hazardous stresses on the wheel.
  - If the pores of an abrasive wheel become clogged, or if the wheel loses its cutting effect, exerting force will cause the wheel to overheat and shatter. Dress the wheel with a proper dresser.