

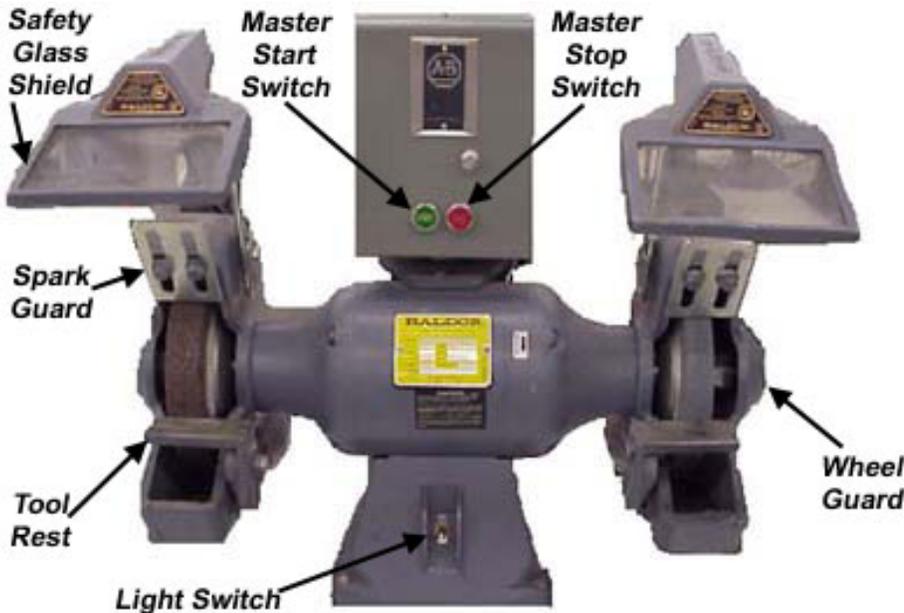


**Naval Support Activity Monterey /
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SAFETY GRAM

PEDESTAL / BENCH GRINDER (Abrasive Wheel Machinery)



Main parts of a pedestal grinder

abrasive particles and ground material by the wheel guards, which are an integral part of a machine. Safety glass shields are also provided for additional protection.

Purpose: The purpose of this Safety Gram is to bring awareness to personnel about this tool. This document is not all inclusive and additional training is required prior to your use in your departmental lab / machine shop. OJT training will be provided by lab manager.

The purpose of machine guarding is to protect the machine operator and other employees in the work area from hazards created by ingoing nip points, rotating parts, flying chips & sparks.

Scope & Applicability: Abrasive Wheel regulatory requirements and SOP's are applicable to all faculty, staff, and students, temporary/term, contract, and permanent employees as well as visitors who may be engaged in operating abrasive wheel machinery located within NSAM/NPS labs, machine shops and other facilities.

Background: Grinding is the process of removing material by the cutting action of the countless hard and sharp abrasive particles of a revolving grinding wheel as they come in contact with the surface to be ground. Grinding machines are made in a variety of types and sizes, depending upon the class of work for which they are to be used. These grinders are used for all kinds of general off-hand grinding and for the sharpening of drills, chisels, tool bits, and other small tools.

The operator is protected against flying



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Excerpt from Abrasive Wheel Machinery Regulations (29 CFR 1910.215):

1. Examine the grinder to see that the tool rest is set at the required height, is within 1/8 of an inch to the face of the wheel, and is securely fastened in this position .
2. Adjust safety glass shields on the grinder to permit clear vision of the part to be ground and still protect the operator from flying particles.
 - o **CAUTION:** Always wear safety glasses when using a grinder.



Position of the tool rest

3. Start the grinder.
CAUTION: Stand to one side of the wheel when operating the grinder.
4. Hold the work in one hand, and steady it with the other. Place the work on the tool rest; then guide it against the face of the revolving wheel and apply enough pressure to grind, depending upon the hardness of the material and the wheel itself.

Note: Support the work on the tool rest to steady it when grinding, except in the case of the small tool bits which can be guided better by supporting them with the fingers or with a hand resting on the tool rest.

5. Cool work in a water pot as it becomes heated from grinding, especially the small hardened tools which would lose their temper if overheated. Twist **drills should not** be cooled by dipping in water, as it may cause cracking.
6. Grind the job to the required shape or size by moving the work back and forth across the face of the wheel. This will prevent wearing a groove into the wheel and will result in a flatter surface on the work.

CAUTION: Keep fingers away from the revolving wheel, especially when grinding small pieces. Also make sure that the tool rest is close enough to the wheel to prevent the work from slipping into the space between the two.

Note: Remove as much metal by rough grinding as is possible; then use the finer wheel for finishing.

Do not grind on the side of the wheel except when absolutely necessary, and then with only **light** pressure.

7. Check work with a gage or other measuring tool.
8. Stop grinder.



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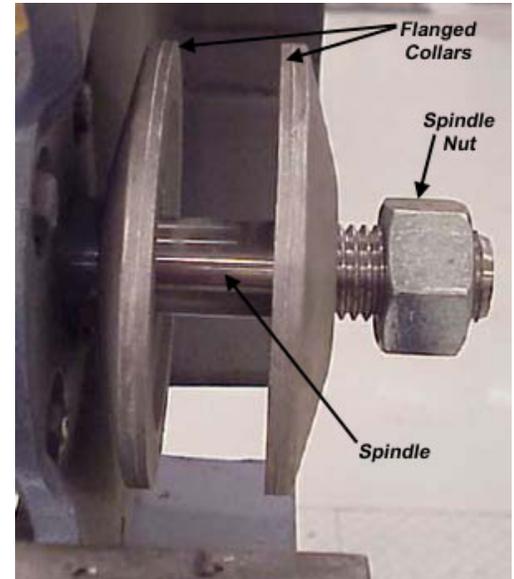


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Mounting a Grinding Wheel

The grinder spindle has a right-hand thread on the right end and a left-hand thread on the other as a safeguard against the wheel loosening. Each wheel is mounted directly on the spindle of the bench or floor grinder and is held between a pair of flanged collars by either the right- or left-hand spindle nut.

Great care must be used when mounting wheels so that no undue strains are set up, which might cause the wheel to break. A wheel that fits tightly should never be forced on the spindle. Instead, the lead-bushed hole should be scraped to make it fit freely.



Spindle parts for a pedestal grinder

Blotting paper washers or pads of some soft compressible material are always placed between the side of the wheel and the flanged collars. This lessens the danger of setting up strains in the wheel, causing it to crack. The clamping nut should be drawn only tight enough against the flanged collar to prevent the wheel from turning on the spindle. After mounting, the wheel should be checked for trueness and balance.

CAUTION: Replace all guards before starting the grinder.

When starting the grinder with a newly mounted wheel for the first time, always stand to the side of the wheel and allow it to run for one minute before starting to grind. This will guard against any injury in the event the wheel is faulty and should break apart.

Dressing a Grinding Wheel

Dressing is the process of restoring the sharpness of the grinding wheel by breaking away the dulled abrasive crystals or by removing the glazed or loaded surface of the wheel, thus presenting new sharp cutting edges of the abrasive grains. This breaking away is caused by the pressure of the dresser crushing the bond and releasing the dull abrasive.

This process should not be confused with truing, which refers to the shaping of any part of the wheel to run true or to alter it to some desired shape.



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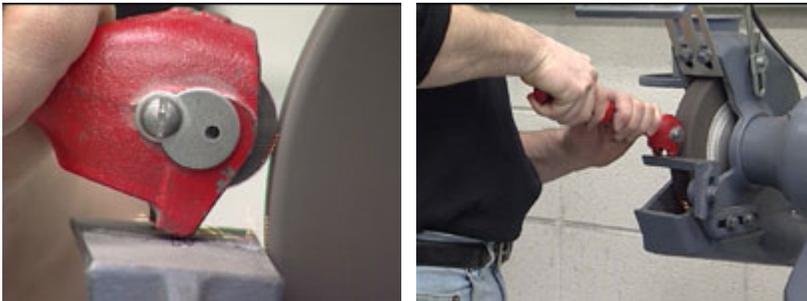
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The tools used for dressing are made in a variety of types and are called dressers. The more commonly used off-hand dressers are: the star type and the diamond stick.



Grinding wheel dressers

To dress the wheel, support the dresser on the tool rest so that the point of contact is slightly above the center, and with the handle tilted upward at an angle as shown.

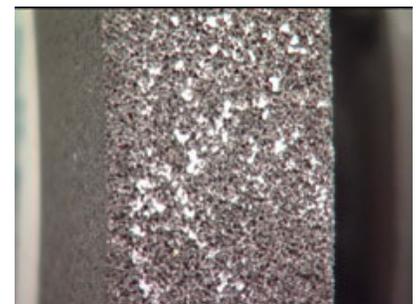


Dressing face of a grinding wheel

Slowly press the dresser against the face of the revolving wheel until it "bites." Then move it back and forth to obtain a straight surface, and at the same time, hold the dresser rigidly enough on the tool rest to maintain trueness while dressing.

Loading is caused by:

- 1) metal too soft and/or
- 2) wheel bond too strong (Figure 9). When self-sharpening the wheel, the pressure of grinding will either fracture the grain or pull it out of the bond when it becomes dull. This action exposes new, sharp-cutting edges.



Loaded grinding wheel.



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Grinding is a safe operation if a few basic safety rules are followed. Use the rules listed below as a guide for safe grinding. These rules are based on material contained in ANSI B7.1 safety code for safe use and operation of abrasive wheels.

WARNING

IMPROPER USE MAY CAUSE BREAKAGE AND SERIOUS INJURY.

DO

and

DON'T

DO ALWAYS HANDLE AND STORE WHEELS IN A CAREFUL manner.

DON'T USE A CRACKED WHEEL OR ONE THAT HAS BEEN DROPPED or has become damaged.

DO VISUALLY INSPECT all wheels before mounting for possible damage and ring test vitrified wheels.

DON'T FORCE A WHEEL ONTO THE MACHINE OR ALTER the size of the mounting hole - if the wheel won't fit the machine, get one that will.

DO CHECK MACHINE SPEED against the established maximum safe operating speed marked on the wheel.

DON'T EVER EXCEED MAXIMUM OPERATING SPEED established for the wheel.

DO CHECK MOUNTING FLANGES for equal and correct diameter.

DON'T USE MOUNTING FLANGES ON WHICH THE BEARING SURFACES ARE NOT CLEAN, FLAT, AND FREE OF BURRS.

DO USE MOUNTING BLOTTERS when supplied with wheels.

DON'T TIGHTEN THE MOUNTING NUT EXCESSIVELY.

DO BE SURE WORK REST is properly adjusted. (Center of wheel or above; no more than 1/8" away from the wheel.)

DON'T GRIND ON THE SIDE OF THE WHEEL. (see Safety Code B7.1 for exception.)

DO ALWAYS USE A SAFETY GUARD covering at least one-half of the grinding wheel.

DON'T START THE MACHINE UNTIL THE WHEEL GUARD IS IN PLACE.

DO ALLOW NEWLY MOUNTED WHEELS to run at operating speed, with guard in place, for at least one minute before grinding.

DON'T JAM work into the wheel.

DO ALWAYS WEAR SAFETY GLASSES or some type of eye protection when grinding.

DON'T STAND DIRECTLY IN FRONT of a grinding wheel whenever a grinder is started.

DO TURN OFF COOLANT before stopping wheel to avoid creating an out-of-balance condition.

DON'T FORCE GRINDING so that the motor slows noticeably or the work gets hot.



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Standard Operating Procedure:

EQUIPMENT: GRINDER (Pedestal and Bench Mounted)

1. PERSONAL PROTECTIVE EQUIPMENT REQUIRED:

- (a) Goggles or Face Shield (Impact Resistant)
- (b) Hearing Protection

2. OPERATION:

- (a) Only authorized personnel shall operate this equipment
- (b) Follow shops general safety rules
- (c) All areas around equipment shall be kept clear of obstructions and in a non-slippery condition
- (d) Do not place loose tools or parts on top of equipment
- (e) Personal protective equipment shall be worn when operating this machine
- (f) Ensure that machinery mounted protective eye/face shields are in place and secured to machine
- (g) Ensure that the work rest and upper peripheral guard is 1/16" to 1/8" of the grinding wheel
- (h) Stand to one side when turning power on. A stone ordinarily breaks on the start if it is faulty
- (i) Grind on the face of the wheel, never on the side
- (j) Never reach over any rotating/moving machinery parts
- (k) Upon completion of the job shut off power switch to grinder
- (l) Check wheels for "chip Loads" embedded in the grain of the wheel, remove from the wheel when found
- (m) Resurface grinding wheel when necessary
- (n) Never use grinding wheel past it's rated RPM
- (o) Work area and machine will be cleaned after each use, empty chip bag when required

3. AUTHORIZED PERSONNEL:

(List of people or department)



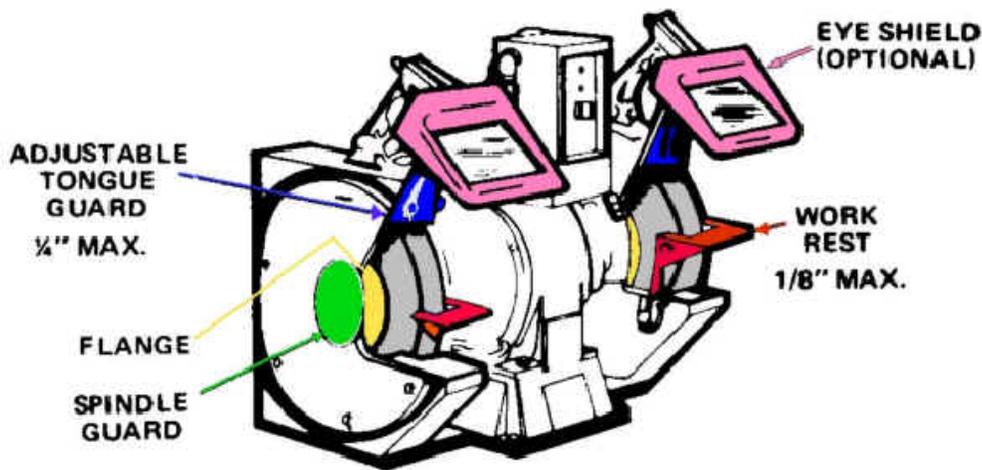
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Checklist for Abrasive Wheel Equipment Grinders¹



Standard 29 CFR 1910	Description	YES	NO ²
<i>From the Abrasive Wheel standard</i>			
215(a)(2)	Do side guards cover the spindle, nut and flange and 75% of the wheel diameter?		
215(a)(4)	Is the work rest used and kept adjusted to within 1/8-inch (0.3175cm) of the wheel?		
215(b)(9)	Is the adjustable tongue guard on the top side of the grinder used and kept to within 1/4-inch (0.6350cm) of the wheel?		
215(d)(1)	Is the maximum RPM rating of each abrasive wheel compatible with the RPM rating of the grinder motor?		
215(d)(1)	Before new abrasive wheels are mounted, are they visually inspected and ring tested?		
<i>From other OSHA standards</i>			
22(a)	Is cleanliness maintained around grinders?		
94(b)(2)	Are dust collectors and powered exhausts provided on grinders used in operations that produce large amounts of dust?		
133(a)(1)	Are goggles or face shields always worn when grinding?		
212(b)	Are bench and pedestal grinders permanently mounted?		



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304(f)(4)	Is each electrically operated grinder effectively grounded?		
305(g)(1)(iii)(A)	Are fixed or permanently mounted grinders connected to their electrical supply system with metallic conduit or other permanent method?		
305(j)(4)(ii)(F)	Does each grinder have an individual on and off control switch?		

Footnotes:

¹ Extracted from OSHA Publication No. 2209. This check list does NOT include ALL elements of 29 CFR 1910.215; it is only a guide.

² A mark in this column indicates a need for corrective actions.