Detail Sheets

Abrasive Wheel Grinder

A grinding machine is a machine designed primarily for metal removal, producing a change in shape, size and surface finish by placing a workpiece against a rotating abrasive surface or wheel. Grinding machines may also be used for grinding metal, glass, ceramics, plastics, and rubber. All grinding machines use a high speed rotating abrasive wheel. This wheel may be fed into the stock or the stock may be fed into the wheel. The machines range from simple stand or bench grinders used for snag grinding or tool sharpening to fully automatic precision machines where stock handling and machine operation is performed from a control station. Examples of grinding machines include abrasive belt machines, abrasive cutoff machines, cylindrical grinders, centerless grinders, electolytic grinding machines, gear grinders, honing machines, internal grinders, jig grinders, lapping machines, offhand grinders, surface grinders, swing frame grinders, snagging grinders, thread grinders and verticle grinders.

Operator Involvement: The grinder operator hand holds the stock, rests it on a tool or work rest and feeds it into the wheel. He is usually standing directly in front or above the point of operation with his hands very close to the area where grinding occurs.

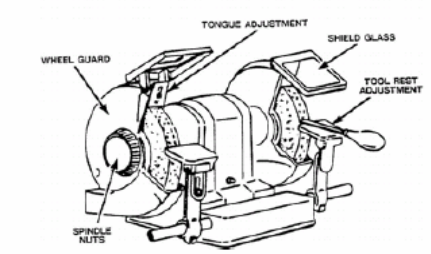
Hazards: Severe friction burns, crushed fingers and loss of eyesight are common injuries arising from accidents which occur when using abrasive wheels. The main hazards arise from the ejection of pieces of the wheel or work piece, contact with the wheel and trapping of fingers between the wheel and work rest.

Machines: All machines must be stable or otherwise secured in place to prevent movement 1910.212(b). A notice should be displayed on the machine stating the maximum speed of it's spindle within each of it's operating speeds. Efficient means of starting and stopping the machine should be readily accessible to the operator.

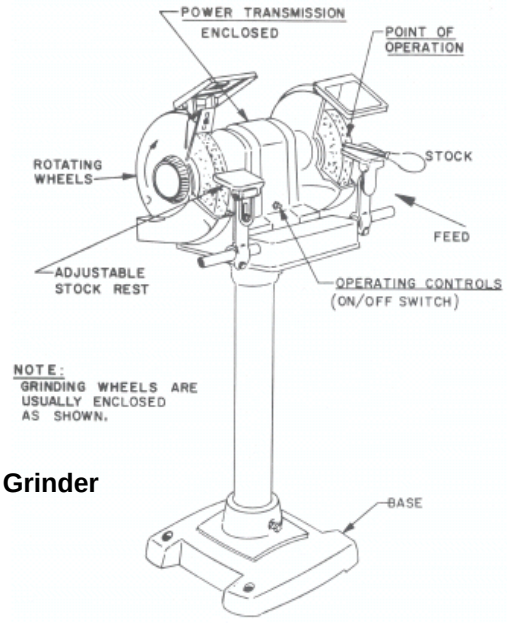
Guarding: Ensure the use of side guards that cover the spindle, nut and flange and 75% of the wheel diameter. 1910.215(a)(2).

- In order to prevent the work piece jamming between the work rest and the wheel, the work rest must be located within l/8 inch of the wheel. 1910.215(a)(4)
- To retain the abrasive wheel in case of breakage, the tongue guard must be located with 1/4 inch of the wheel. 1910.215(b)(9)

Fixed transparent guards are optional items that can be fitted for protection against ejection.



Bench Grinder



Pedestal Grinder

Case Study

An apprentice mechanic lost the sight of his left eye when it was stuck by the debris from a disintegrating wheel. The wheel was poorly fitted and was operated at a greater speed than its design speed.

References: **OSHA** 29 CFR 1910.215(a)(1); ANSI B11.9

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Make sure that all power transmission is completely enclosed to prevent contract. This includes rotating components such as flywheels, gears, sheaves, shafts, belts and pulleys, chain and sprocket, meshing gears. 1910.219.

Wheel Selection: The wheel selected must be suitable for the jobs in which it will be used; in general, soft wheels are used on hard materials and hard wheels on soft materials - manufacturers should be asked for advice on selection. Never exceed the maximum speed of the wheel

Inspection: On receipt of a wheel, carefully inspect it. Clean with a soft brush and examine for damage. Conduct a “ring” test. This involves striking the wheel with a non-metallic tool such as a screwdriver handle. If the wheel is good, a clear ring will be heard; if the ring is dead the wheel is cracked and should not be used. 1910.215(d)(1)

Storage: Wheels should be stored in a cool, dry area. Suitable racks or bins should be provided and precautions should be taken to prevent the wheels rolling or falling over.

Wheel Mounting: This must be done by a competent person who has been properly trained. Abrasive wheels should only be mounted on the type of machine for which they were designed and it is essential that the speed of the spindle does not exceed the maximum speed marked on the wheel. 1910.215(d)(1)

Safer Work Practices:

- ❑ Operators must be properly trained and they should not wear loose clothing such as ties or jewelry which could become entangled.
- ❑ Guards should always be in place and suitable face protection should be worn.
- ❑ Before starting the operation, let the grinder 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.
- ❑ The floor space around the machine should be kept free of obstructions and slippery substances.
- ❑ The machine should only be used by one person at a time and should not be kept running when not in use.
- ❑ Ensure that the work rest and tongue guard is correctly adjusted before operating. Both should be adjusted as the wheel wears.
- ❑ The work piece should be held firmly and should be moved across the face of the wheel so that the wheel wears evenly, for small jobs clamps or similar devices can be used.

The number of accidents and the circumstances in which they occur show that most can be avoided by a knowledge of the risks and by adopting safety measures. The simple safety steps given below will help to prevent most accidents at grinding machines. You may find them useful as a safety check list.