Introduction:
Abrasive grinding wheel machinery comes in many styles, sizes, and designs. These grinders often have either two abrasive wheels, or one abrasive wheel and one special-purpose wheel such as a wire brush, buffing wheel, or sandstone wheel.

Bench-style and pedestal grinders create special safety problems due to the potential of the abrasive wheel shattering; exposed rotating wheel, flange and spindle end; and a naturally occurring nip point that is created by the tool/work rest. This is in addition to such concerns as flying fragments, sparks, air contaminants, etc. Cutting, polishing, and wire buffing wheels can create many of the same hazards.

These machines are powerful and are designed to operate at very high speeds. If a grinding wheel shatters while in use, the fragments can travel at more than 300 miles per hour. In addition, the wheels on these machines (abrasive, polishing, wire, etc.) often rotate at several thousand rpms. The potential for serious injury from shooting fragments and the rotating wheel assemblies (including the flange, spindle end, and nut) is great.

WCTC Abrasive Grinding Wheel Machinery Program
WCTC has implemented an Abrasive Grinding Wheel Machinery Program to establish procedures to protect employees and students from the hazards associated with abrasive grinding wheel machinery and to comply with the requirements of OSHA’s 1910.215 Abrasive Wheel Machinery Standard and Wisconsin Department of Commerce 32.15. A copy of the Abrasive Grinding Wheel Machinery Program can be obtained from the Environmental, Health and Safety Office or the Environmental / Safety Resources section of the Portal.

Guarding Requirements
The College requires all machinery to be properly guarded whenever the machine is in operation. Machinery that is not properly guarded should be locked out and removed from service until the proper guarding has been properly installed. Refer to Figure 1 for the proper abrasive grinding wheel machinery guarding.

Work Rest – The work rest will be securely adjusted so that the distance from the abrasive grinding wheel and the part of the work rest is no more than 1/8 inch.

Tongue Guard - The tongue guard will be securely adjusted so that the distance from the abrasive grinding wheel and the lower lip of the tongue guard is no more than 1/4 inch.

Flange– Each grinding wheel shall be mounted between two flanges that are no less than 1/3 the diameter of the abrasive wheel. The flange shall also be dimensionally accurate and balanced with no rough surfaces or sharp edges.

Spindle / Side Guards - The spindle and side guards must be in place to protect against the spindle and spindle nut and cover 75% of the abrasive wheel.

Figure 1 - Abrasive Grinding Wheel Machinery Guarding Requirements
Operating Procedures
Even when a grinding wheel is tested and equipped with all possible safety devices, grinding is still a hazardous activity. It is important to always follow these safe work practices:

- Everyone in the area should wear proper eye protection when abrasive grinding wheel machinery is in use.
- Never wear loose clothing, ties, rings or other jewelry.
- Keep long hair up or tied back.
- Stand to one side of the wheel when first turning on the power.
- Let the machine run at full speed for one minute while everyone stands clear.
- Bring the work piece slowing and smoothly into contact with the wheel (don’t bump the wheel).
- Give a cold wheel a chance to warm up.
- Do not force objects against the wheel so that the motor slows down excessively or stalls.
- Do not side grind on the flat side of a straight wheel; use wheels designed for this purpose.
- If a wheel breaks, find out why and eliminate the causes.
- Adjust the work rest so the maximum clearance from the wheel is (1/8 inch) and it is above the horizontal centerline of the wheel.
- Do not adjust the work rest while the wheel is moving.
- If a grinder appears to be defective or unsafe, have it locked out and report the problem immediately to your supervisor.
- Never operate a wheel at a speed above the manufacturer’s recommendation.
- Dispose of damaged wheels immediately.
- Keep the work area around the machine clear.

Mounting of Abrasive Grinding Wheels
Only authorized employees will be allowed to remove and mount abrasive grinding wheels. The following procedure will be used for the removal, disposal and mounting of abrasive grinding wheels.

1. Unplug and/or lockout the abrasive wheel machinery and remove the old abrasive grinding wheel. Abrasive grinding wheels that are bad shall be disposed of in the garbage.
2. Before mounting the new wheel, the wheel shall be closely visually inspected and sounded by the user (ring test) to make sure it was not damaged in transit, storage, or otherwise. Reference Appendix A “How to Conduct a Ring Test”.
3. Once the wheel passes the ring test it can be mounted on the grinding machinery.
4. Place the inside flange on the spindle. The flange must cover a minimum of 1/3 the diameter of the abrasive grinding wheel.
5. Place the abrasive grinding wheel on the arbor. Grinding wheels shall fit freely on the spindle and remain free under all grinding conditions.
6. Place the spindle and side guard back in place.
7. Adjust the work rest guard to within a 1/8 inch of the wheel and the tongue guard to a 1/4 of the wheel.
8. Put the abrasive grinding wheel machinery back in service.

How to Conduct a Ring Test
In addition to visual inspections, a “ring test” must be performed to identify any damage that may have taken place during storage or transport. A disintegrating wheel can cause solid wheel fragments to fly off at very high rates of speed resulting in serious injury or even death. The ring test helps identify defective grinding wheels.

A ring test is conducted by tapping the wheel gently with a light, nonmetallic implement, such as the handle of a screwdriver for light wheels or a wooden mallet for heavier wheels. The wheels should be “tapped” about 1 or 2 inches from the outer edge of the wheel (Figure O-25 and Figure O-26). Rotate the wheel 45-degrees and repeat the test. An undamaged wheel will give a clear metallic tone. If it is cracked, there will be a hollow, “dead” sound and you will not hear a clear “ring.” In this case do not use the wheel!
Wheels must be dry and free from sawdust when conducting the ring test, otherwise the sound will be deadened. It should also be noted that organic bonded wheels do not emit the same clear metallic ring as do vitrified and silicate wheels.

Proper Ring Test Locations
Figure O-25 Small Wheels
Figure O-26 Large Wheels

Inspection
Inspections should be conducted at the time of use and monthly. The time of use inspection is to be completed by the individual using the machinery and consists of a visual inspection of the work rest, tongue guard, and grinding wheel.

Departments will be responsible for conducting the monthly inspection. These inspections will be documented on the Abrasive Grinding Wheel Machinery Monthly Inspection Form and shall be maintained by the department for a time period of one year. Any grinder that is not in proper working order or is not properly guarded shall be locked out until the deficiency has been corrected.

During the monthly inspection the following items will be inspected:
- Work Rest within 1/8 inch of the grinding wheel
- Tongue Guard within 1/4 inch of the grinding wheel
- Proper size grinding wheel
- Condition of the grinding wheel
- Spindle / Side Guards in place
- RPM rating of the wheel matches RPM rating of the grinder
- Cleanliness around the grinders
- Grinder properly grounded
- On / Off switches

Any grinder that is not in proper working order or is not properly guarded shall be locked out until the deficiency has been corrected.
WCTC Abrasive Grinding Wheel Machinery Quiz

Name: ___________________________      Date: ___________________________
ID#: ___________________________      Dept: ___________________________
Score: ___________________________

Indicate if the following statements are TRUE or FALSE. A passing score for the quiz is 80%. Upon completion forward the quiz and training acknowledgement form to the Environmental, Health and Safety Office (C-210D).

TRUE   FALSE  Abrasive grinding wheel machinery creates potential hazards due to the potential of the abrasive wheel shattering; exposed rotating wheels and in-running nip points by the tool/work rest.

TRUE   FALSE  Work rests should be adjusted so that the distance from the abrasive grinding wheel and the part of the work rest is no more than 3/4 inch.

TRUE   FALSE  Tongue guard should be securely adjusted so that the distance from the abrasive grinding wheel and the lower lip of the tongue guard is no more than 1/4 inch.

TRUE   FALSE  Spindle and side guards must be in place to protect against the spindle and spindle nut and cover 50% of the abrasive wheel.

TRUE   FALSE  Grinders should be inspected by the operator after each use to ensure safe operating conditions for the next time the machinery will be used.

TRUE   FALSE  When working with grinding machinery, only the operator is required to wear proper eye protection when using abrasive grinding wheel machinery.

TRUE   FALSE  Ring tests need to be completed every time abrasive grinding wheel machinery is used.

TRUE   FALSE  Undamaged grinding wheels will have a clear metallic tone when ring tested.

TRUE   FALSE  Grinding wheels can be operated safely at 25% above the manufacturer’s speed recommendation.

TRUE   FALSE  Grinding machinery that is not properly guarded or defective should be reported to the department manager and taken out of service at the end of that day.

Forward completed forms to the Environmental, Health and Safety Office (C-210D)
Waukesha County Technical College
Abrasive Grinding Wheel Machinery
Training Acknowledgement

On the date listed below I completed Waukesha County Technical College’s Abrasive Grinding Wheel Machinery Training Program. The training consisted of the following information.

- Introduction
- Hazards of abrasive grinding wheel machinery
- Proper guarding
- Work Rests / Tongue Guard Settings
- Checking condition of wheel
- Reporting damaged wheels
- How to conduct a “Ring Test”
- How to properly mount wheels

If you have any questions or would like to review WCTC’s Abrasive Grinding Wheel Machinery Program please contact the Environmental, Health and Safety Office (262) 691-5226. A copy of the plan is also located on the WCTC’s Employee Portal.

I hereby acknowledge that I have completed Waukesha County Technical College’s Abrasive Grinding Wheel Machinery Training and understand it is my responsibility to follow procedures per instruction and training.

Authorized Employee Name (print): ____________________________  Authorized Employee Signature: ____________________________

Employee I.D. #: ____________________________  Date: ____________________________

Forward completed forms to the Environmental, Health and Safety Office (C-210D)