

Bench Grinder Safety



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Bench Grinder Safety



Bench grinders and bench grinding wheels have been in service for over 100 years and, when used correctly, they are a safe and effective tool. The causes of most accidents with these products have been related to misuse and abuse.

An important way of avoiding wheel breakage and injury is to follow these Best Practices for Bench Grinding Wheels.

Blotter



The proper use of blotters can aid in preventing wheel breakages. Blotters, by definition, are compressible washers that must be placed between an abrasive wheel and a mounting flange. These blotters are more than just cardboard or paper, but are designed to strict standards for material type, thickness, coefficient of friction, and compressibility. Use only blotters that are supplied or recommended by the abrasive wheel manufacturer. Blotters help to assure that the flange clamping pressure is evenly distributed on the wheel. They tend to cushion the pressure of flanges against any high points or uneven surfaces. They also prevent damage to the surfaces of the flanges from the coarser abrasive surfaces of the wheel. You must therefore use one clean new blotter for each mounting flange. Additionally, blotters provide a better coefficient of friction than would be obtained between the flanges and the wheel without blotters, thereby providing better transmission of the driving power to the wheel.



Blotter



A question was asked, “What diameter blotter must I use when mounting a grinding wheel?”

The answer is simple. The blotter must be equal to or greater than the machine’s mounting flanges.

In other words, wheel blotters should NEVER be smaller than the machine’s mounting flanges. The grinding wheel is driven by the machine flanges. The forces that drive the wheel are transmitted through the bearing surface of the flanges. The surface that drives the wheel (bearing surface) must always be in contact with the side of the wheel. A flange that is larger than the wheel’s blotter will hang over the blotter and not make full contact with the side of the grinding wheel. This lack of contact (overhang) could lead to wheel slippage, uneven or increased side pressure and breakage.

The lesson is simple, use only blotters that are equal to, or larger than the machine mounting flanges. Never re-use old blotters when remounting wheels. Never use a blotter smaller than the machine’s flanges. Always play it safe at the wheel.



Blotter & Flanges

Mounting diagram explaining several key points for safe mounting:

- Both flanges must be of the same diameter.
- Flanges must have bearing surface near the outer edge and clearance at the center.
- Inner flanges must be locked (keyed) onto the spindle.
- A blotter (washer) must be placed between flange and grinding wheel.
- Spindles must be long enough to engage all threads of the end-nut.
- Do inspect mounting flanges for equal size, relief around the wheel's hole, and the correct diameter. Flange diameter must be equal to or greater than one-third the wheel's diameter (e.g. 6 inch wheel, 2 inch flange).
- Do use flanges that are clean, flat, and smooth.

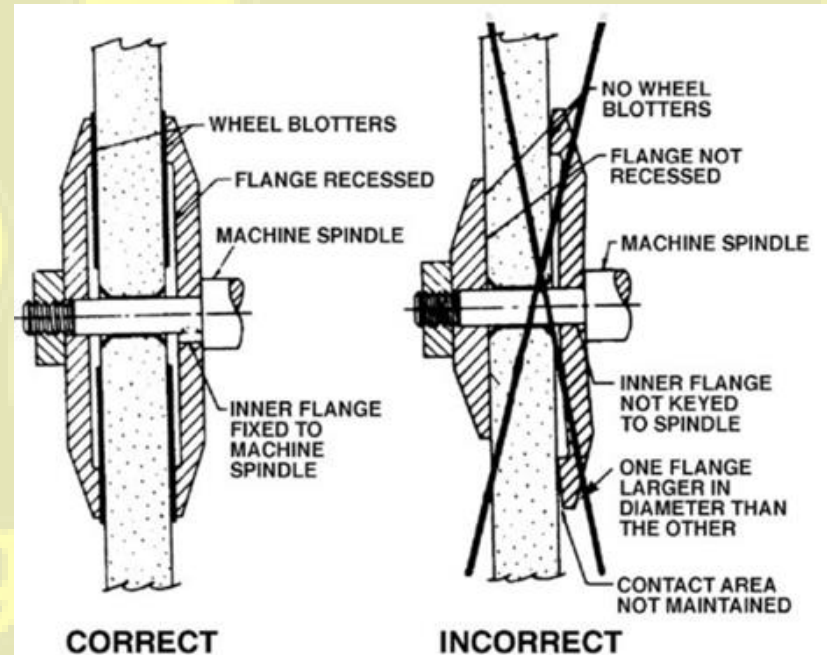
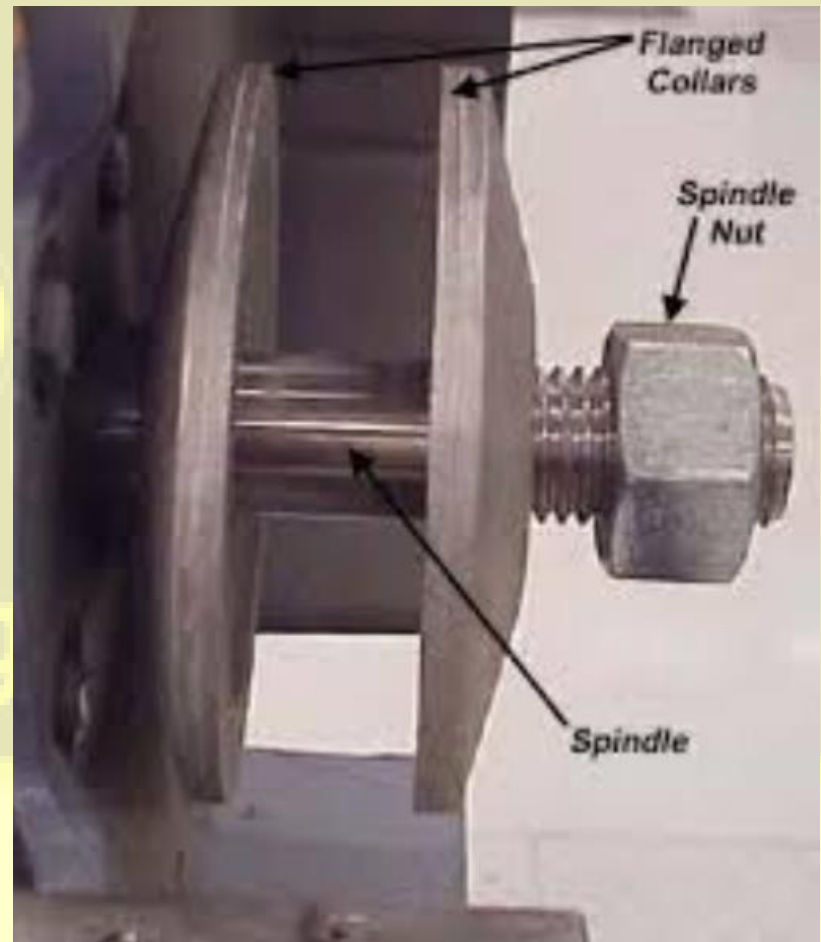


Figure 2. ANSI B7.1 mounting diagram from 2010.

Blotter & Flanges



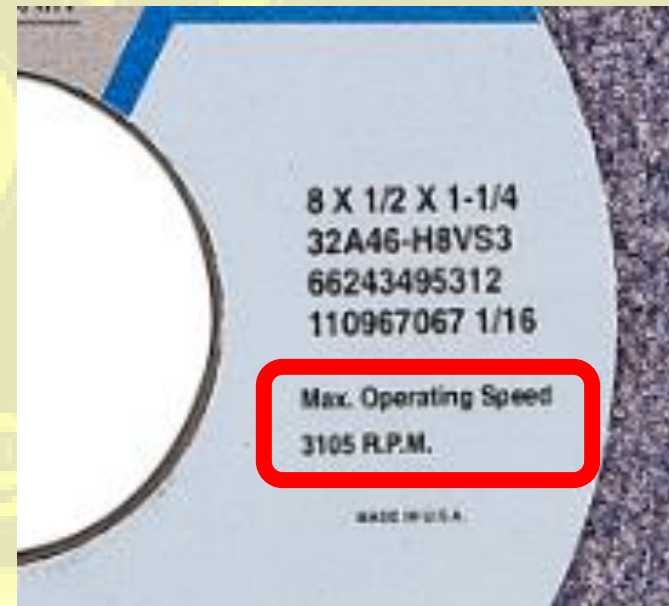
- Don't force a wheel onto the machine or alter the size of the wheel's mounting hole. If the wheel won't fit the machine, get one that will fit properly.
- Don't use mounting flanges on which the bearing surfaces are not clean, flat, and smooth.
- Don't tighten the mounting nut excessively. Tighten the nut just enough to prevent wheel slippage.
- Don't start the machine until the safety guard is properly and securely in place.
- Don't stand in front of or in line with a grinding wheel whenever a bench grinding machine is started.
- Don't use this wheel if you have not reviewed all of the safety materials and have not been properly trained in the use of the tool and wheel.



Wheel Speed (RPMs)



Do check machine speed against established safe operating speed marked on the wheel.



Don't exceed the speed marked on the grinding wheel.

Ring Test



Do visually check all wheels for cracks or damage before use.

In addition to the visual inspection, "**Ring Test**" all wheels before mounting on the bench grinder.

One method of grinding wheel inspection is called ring testing. OSHA, ANSI and the grinding wheel manufacturers require this method of grinding wheel inspection. It must be performed BEFORE the wheel is mounted on a grinding machine. Ring testing depends on the damping characteristics of a cracked wheel to alter the sound emitted when the wheel is tapped lightly. It is subject to interpretation by the inspector and is primarily applicable to vitrified bonded wheels. To perform the ring test, wheels should be tapped gently with a light nonmetallic implement, such as the handle of a screw driver for light wheels, or a wooden mallet for heavier wheels.

1. Tap wheels about 45 degrees each side of the vertical line and about 1" or 2" from the periphery. Rotate the wheel 45 degrees and repeat the test.
2. Large and thick wheels may be given the ring test by striking the wheel on the periphery rather than the side of the wheel.
3. A sound and undamaged wheel will give a clear tone. If cracked, there will be a dead sound and not a clear ring and the wheel shall not be used.
4. Wheels must be dry and free of sawdust when applying the ring test, otherwise the sound may be deadened. The ring test is not applicable to certain wheels because of their size, shape or composition.

Don't use wheels that have been dropped or otherwise damaged.

If the wheel does not pass a "Ring Test", do not use it.

Grinder Side Guard

Do make sure the bench grinder has the proper wheel guard. Bench grinder guards should have side guards that cover the spindle, end nut, and flanges. It must cover 75% of the wheel's diameter.



Work Rest Guard



Do make sure your bench grinder has an adjustable work rest that is kept adjusted to 1/8 inch or less from the wheel's grinding face.

OSHA 1910.215(a)(4)

Work rests. On offhand grinding machines, work rests shall be used to support the work. They shall be of rigid construction and designed to be adjustable to compensate for wheel wear. Work rests shall be kept adjusted closely to the wheel with a maximum opening of one-eighth inch to prevent the work from being jammed between the wheel and the rest, which may cause wheel breakage. The work rest shall be securely clamped after each adjustment. The adjustment shall not be made with the wheel in motion.

Dangers:

Fingers &/or hand pulled into grinder causing serious injury and even risk of amputation.



Don't adjust the work rest while the grinding wheel is rotating.

Tongue Guard



Do make sure your bench grinder has an adjustable tongue guard/spark arrestor and set it to $\frac{1}{4}$ inch or less from the wheel's grinding face.

OSHA 1910.215(b)(9)

Exposure adjustment. Safety guards of the types described in Subparagraphs (3) and (4) of this paragraph, where the operator stands in front of the opening, shall be constructed so that the peripheral protecting member can be adjusted to the constantly decreasing diameter of the wheel. The maximum angular exposure above the horizontal plane of the wheel spindle as specified in paragraphs (b)(3) and (4) of this section shall never be exceeded, and the distance between the wheel periphery and the adjustable tongue or the end of the peripheral member at the top shall never exceed **one-fourth inch.**

Dangers:

If the wheel explodes there is cause of serious shrapnel being thrown out of the machine causing serious injury and even death.

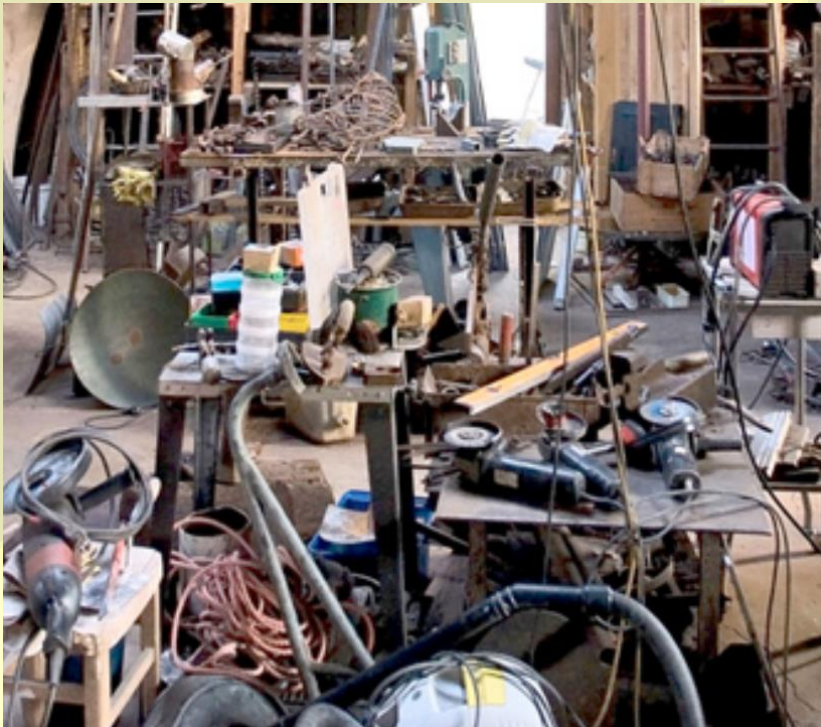


Don't adjust the tongue guard/spark arrestor while the grinding wheel is rotating.

Work Area



Do keep your work area clean and free of anything that could accidentally strike or make contact with the grinding wheel.



Restart on Power Loss



OSHA 1910.213(b)(3)

On applications where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power.

It is recommended that the hard switch be removed and a contactor with start/stop controls be installed to eliminate the risks of restarting on power loss.



Start up test



Starting a machine with a new grinder wheel:

- Do allow newly mounted wheels to run at operating speed for **one minute** before grinding.
- Do not stand in front of or in line with the rotating grinding wheels during this test because, if damaged, the wheel most likely will break during this test.

Side Grinding

Do grind on the wheel's face (outer diameter) only. Side grinding is NOT allowed.

Don't grind on the side of the wheel.



Foreign Metals



Do keep your grinding wheel face open and free of metal build-up. Dress wheel to remove foreign metals and to open the wheel face with new sharp abrasive grains.

Don't grind material for which the wheel is not designed. Do not grind/sand wood, plastic, or any other non-metallic materials.



Note: Aluminum is not meant to be ground on a bench grinder.

Mounting

Do make sure your bench and pedestal grinder is permanently mounted. It should not move or fall over during use.



Dust Control

When required, control dust.

- Dry collectors for non-combustible material.
- Wet collectors for combustible material I.E. Titanium.



Other actions...DOs



- Do always handle and store grinding wheels in a careful manner. Most bench grinding wheels are vitrified/glass bonded products and are very strong, but brittle.
- Do review all applicable MSDS (Material Safety Data Sheets) before using this product.
- Do comply with ANSI B7.1, OSHA and all safety materials provided with the wheels and the grinders.
- Do visit the abrasive manufacturer's website for additional safety information.
- Do contact your abrasive manufacturer if you have any safety questions.
- Do maintain your tools as if your life depends on it.

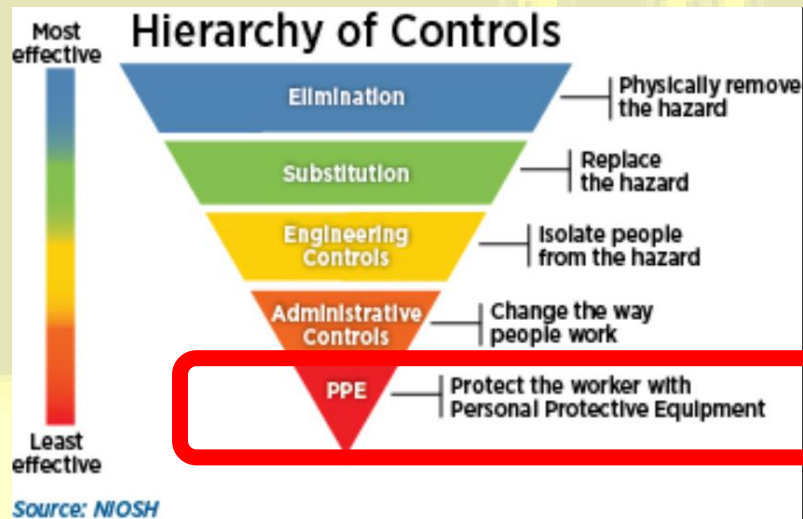
Other actions...Don'ts



- Don't force a wheel onto the machine or alter the size of the wheel's mounting hole. If the wheel won't fit the machine, get one that will fit properly.
- Don't use mounting flanges on which the bearing surfaces are not clean, flat, and smooth.
- Don't tighten the mounting nut excessively. Tighten the nut just enough to prevent wheel slippage.
- Don't start the machine until the safety guard is properly and securely in place.
- Don't stand in front of or in line with a grinding wheel whenever a bench grinding machine is started.
- Don't jam the work into the wheel.
- Don't use this wheel if you have not reviewed all of the safety materials and have not been properly trained in the use of the tool and wheel.

PPE

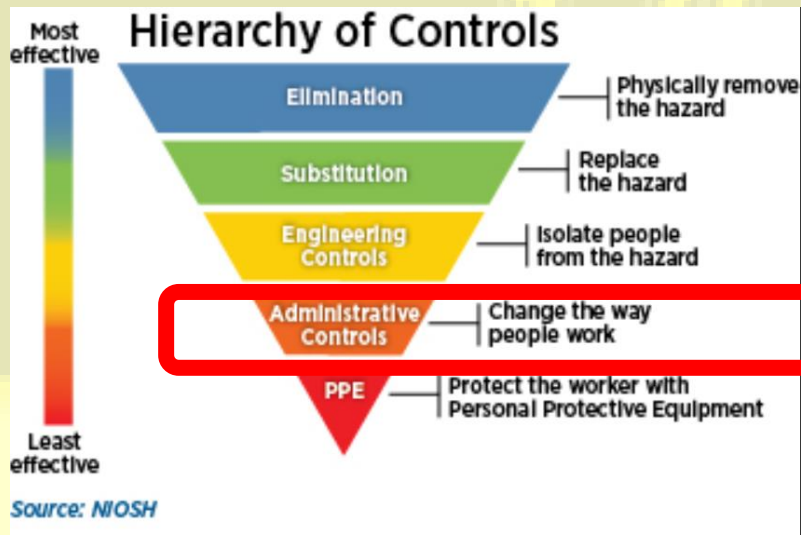
At a minimum, a JHA should identify what personal protection equipment such as eye and face protection, apron, gloves, safety shoes, etc. should be worn during operation.



Admin Controls



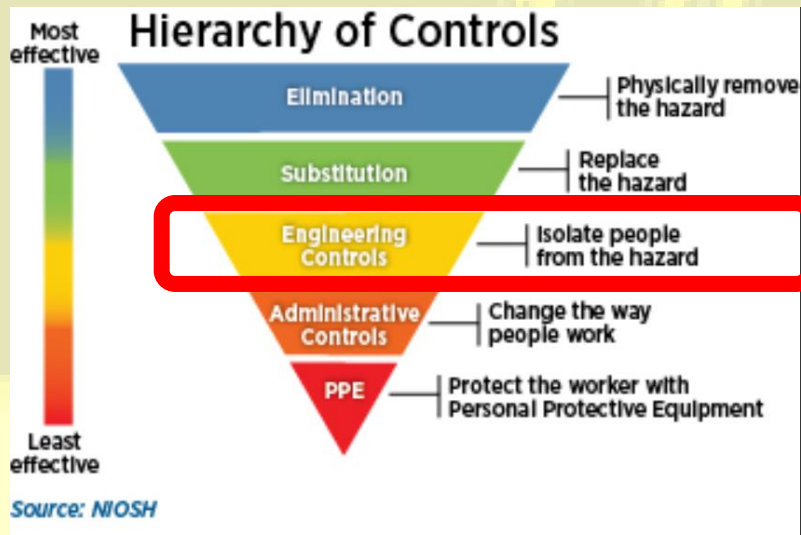
This training is an administrative control as well as human factors based tools like the Patented Odiz No-Go Grinder Safety Gauge.



Engineered Solutions



Odiz Safety has the only patented engineered solution for bench grinders. No-Go Grinder Safety Stand will not start if guards are out of spec.



FEATURING THE: NO-GO™ GRINDER SAFETY STAND

Eliminating Risks of OSHA Fines & Injuries

Bench grinder injuries & OSHA compliance have plagued industries for decades in the form of productivity, employee lost time, & OSHA fines. ODIZ Patent Pending USA Made No-Go™ Grinder Safety Stand will help keep your company be compliant with OSHA's section 1910.215.

PICK FROM 5 OPTIONS:

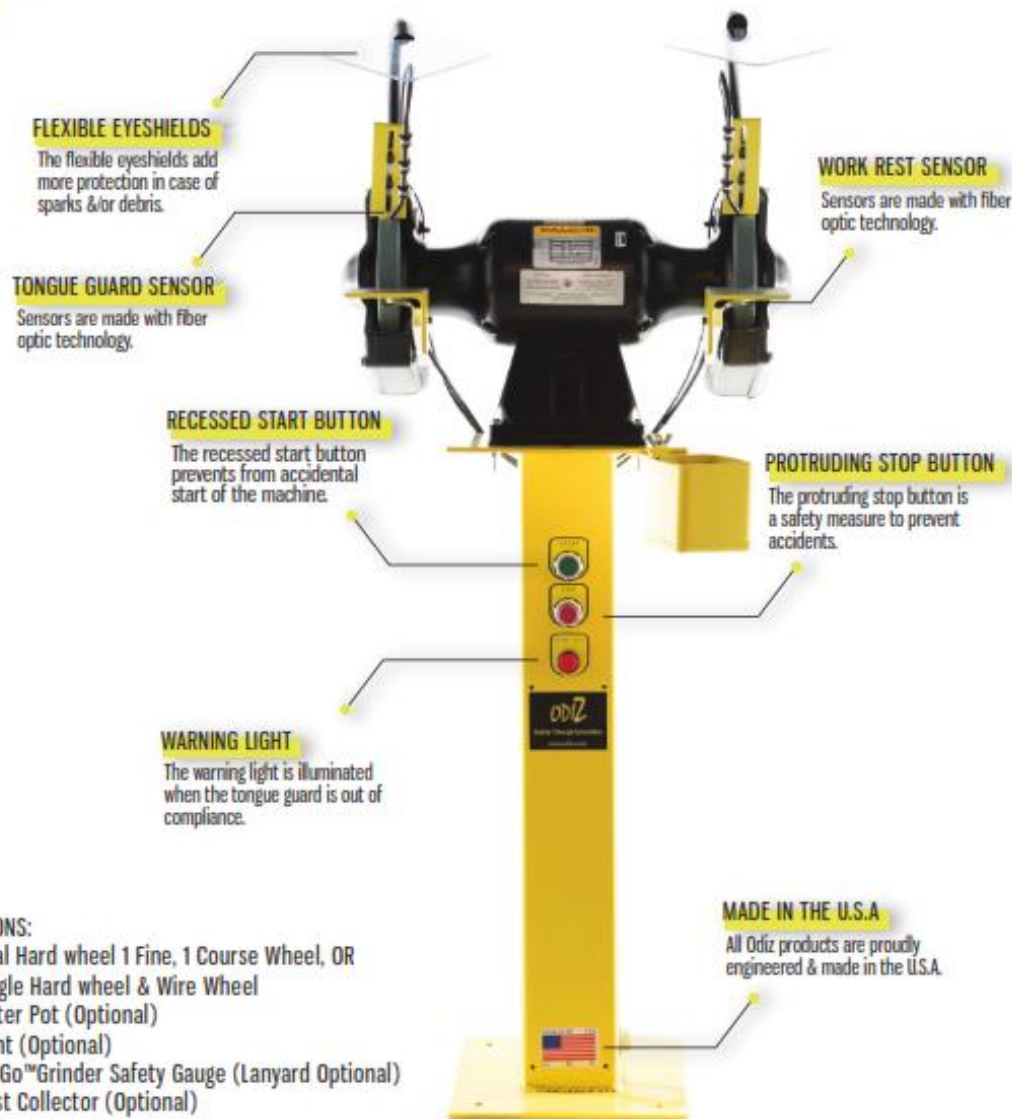
- You retrofit your current Bench Grinder
- ODIZ retrofits your current Bench Grinder
- New 6" Bench Grinder
- New 8" Bench Grinder
- New 10" Bench Grinder

NO-GO™ GRINDER SAFETY STAND INCLUDES/OPTIONS:

- New or Used Bench Grinder (any 110V make or model)
- Stand with Electronic Mods
- Electrical Contactor Package
- Sensor Amplifiers
- Power Supply
- Calibration Switch
- Control Module
- Tongue Guards
- Tongue Guard Sensors
- Work Rest Guards
- Work Rest Sensors
- Eye Shields
- Bolt Installation Kit
- Guard Adjustment Tool
- No-Go™ Grinder Safety Gauge (Magnet)
- Manual

OPTIONS:

- Dual Hard wheel 1 Fine, 1 Course Wheel, OR
- Single Hard wheel & Wire Wheel
- Water Pot (Optional)
- Light (Optional)
- No-Go™ Grinder Safety Gauge (Lanyard Optional)
- Dust Collector (Optional)



Sources

1. www.odiz.com
2. www.osha.gov
3. www.nortonabrasives.com

Safety Through Innovation