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Mill Component Safety

Precautions Page 1

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MILL COMPONENT SAFETY

! NOTICE

Grinding machines may be designed for various waste grinding applications.

Contact the machine manufacturer to be sure that your intended application is suited for the machine and your chosen mill set up prior to attempting to grind.

KNOW & UNDERSTAND YOUR APPLICATION & MILL CONFIGURATION AS IT IMPACTS MACHINE OPERATION HAZARDS INCLUDING THROWN OBJECT HAZARDS.

Prior to using replaceable cutting edges, tips, bits, teeth, screens, hammers, anvils, shear bars, screen support parts, screen retention parts, and any other mill assembly components, make sure that the part properly fits your machine and is suited for your application and actual use of the machine.

1. Compare new parts with an original part known to work. Make note of any dimensional variance and be sure that any variance will not cause improper contact in the mill assembly, improper operation, or improper part retention on rotating parts.
2. Check weight comparison with other similar parts used in the same mill assembly. Be sure to maintain balanced weight in the hammermill assembly.
3. Make sure that all mill parts clear without contacting other parts in the mill assembly including original machine manufacturers recommended clearance between the cutting edge and the screens, shear bars, and other parts. *Check this before powering the mill as catastrophic damage may occur with extreme safety hazards.*
4. Inspect all new and used parts prior to use.
5. Never operate a mill with worn, damaged, cracked, bent, improperly installed, mismatched, or improperly fitting parts.
6. Use extra caution when using new or different style parts. Manually test rotate the mill after new or different parts are first installed. Correct any issues that might be identified.
7. Once the mill passes a manual test rotation, conduct a slow and controlled rotation under power running first as slow as possible prior to increasing speed. Correct any issues that are identified. Use extra care and caution with the first use of any newly acquired part. *Correct problems as soon as they are identified.*

! WARNING

Varying machine setup and grinding applications can change the machines thrown object hazards.

Update your thrown object control zone, policies, and procedures in accordance to your chosen application and machine setup prior to running the machine.

Before operating the machine, be sure to read and understand all of the safety precautions, maintenance directions, and operating instructions associated with your specific machine.

Every machine and every job site may vary in the required safety provisions. Locate, read, understand, and comply with all safety requirements as set by the machine's manufacturer, owner, and job site management.

Work area evaluations are required prior to operation to make sure that the area is suitable for grinding with your application, your machine, & your chosen machine set up. Area control measures must be taken to ensure that the work area remains clear of people & property within the work area's thrown object zone.

Thrown object reduction and control measures need to be taken based on the product that the machine is grinding, how it is being ground, and where it is being ground. The possible volume, velocity, & distance of potential thrown material may increase in the direction of the exposed mill rotation varying along with the size and weight of the material that might be ejected as well as the size, speed, & configuration of the mill assembly.

WARNING

Know, understand, & follow machine manufacturers recommended mill service and safety procedures and information.

WARNING

Never compromise safety in configuring the machine, selecting parts, material construction, choosing applications, locating the machine, and maintaining a safe and secure thrown object zone.

Safety must be the priority.

WARNING

Any dislodged or mis-located mill component or piece of a mill component may become ungrindable metal contamination that may be ejected from the mill or may cause other major damage to other components.

WARNING

As a rule, it is best to NOT reuse any hardware including bolts. Nuts should NEVER be reused.

Some machines are equipped or can be equipped with various thrown object restraint systems. Thrown Object Restraint mechanisms can greatly reduce the amount of material thrown and the distance that material is able to be thrown. If your machine has a thrown object restraint system, be sure to keep it in good working order. Contact your machine's manufacturer for details.

Some machines are equipped with mill assemblies that operate with high inertia and speeds in excess of 500 RPM. The mill is capable of beneficial processing of certain materials, but the same mill has the potential of being very destructive if used improperly.

Only subject the mill to approved, grindable materials to avoid potentially catastrophic circumstances that could include significant damage to the machine, extremely hazardous thrown objects, and/or injury or death.

A variety of options may be available in different hammermill arrangements and some of the primary variations are in the way that cutting edges are maintained.

Hammer tip replacement is normally done in 1 of 4 ways:

1. Bolt-On Tip Service
2. Weld-On Tip Service
3. Build-Up Welding Service
4. Whole hammer replacement.

Each of these methods of maintaining good cutting edges has its own unique benefits and draw backs, and some machines are capable of having different styles of hammers installed to facilitate the operator's choice of some of the 4 different cutting edge maintenance practices.

In that potentially catastrophic hazards exist including deadly ejection of dislodged tips, dislodged hardware, dislodged other components, and other thrown material, owners and operators must make sure that their chosen machine and its mill components are properly used and cared for.

Consult your machine manufacturer for complete information on mill arrangements for your machine.

BOLT ON TIPS:

The Bolt-On style tip is where the mill's hammer shank stays in place as a "holder", and the cutting edge is able to be replaced through a removable tip that is bolted on to the "holder". Bolt-On style tips come in a wide variety of designs and configurations that vary the geometry, the number of usable cutting edges, bolt sizes, bolt types, and many other variables. The users of bolt-on tips may benefit from the ease of maintenance and the economics associated with multiple edges that are usable in the life of the tip, but ***safety must be the priority*** as most bolt-on tip options have a low tolerance for contamination or attempted operation in disrepair.

Being able to quickly and easily change tips allows for very economical maintenance of the cutting edges without requiring the maintenance technician to be a skilled metal worker or welder with welding equipment, and the hammer shanks can stay in place during maintenance.

In addition to using good quality bolt-on tips, it is critical that proper style, proper quality, and properly sized hardware be used.

Once installed & then removed for any reason, nuts should never be reused.

Bolts should only be considered for reuse with very little use, the approval of the hardware supplier, and authorization of the machine's owner based on proper inspection and monitoring the bolts usable life.

WARNING

Your cutting edge style, material construction, and other component choices impact the machine's risk of thrown objects.

Know and understand the risks associated with your machines set-up and application prior to operating the machine.

WARNING

Hammers come in many variations, and some machines may be capable of being equipped with multiple hammer variations under the correct circumstances.

However, not all machines are capable of accepting variations from their original design, style, and material construction.

WARNING

ONLY PROCESS GRINDABLE MATERIALS

Continued on next page.

If the reuse of good bolts with very little use is properly authorized, the bolts must be fully inspected to insure good quality before considering them for reuse, and no bolt should ever have a nut installed on it more than twice for any reason even if it visually passes inspection. Even when a bolt is used for the first time, it should be inspected for quality, and there are limits to how long the bolt should be allowed to operate prior to being changed. **As a rule, it is best to NOT reuse any hardware including bolts.**

If a bolt or nut is ever suspected of being worn or damaged, replace it immediately. Be sure that proper torque is maintained on the tip hardware. **Check proper torque daily.** Proper torque is determined by details associated with the type of bolt, type of nut, type of thread, and whether the components are lubricated or dry. Rust and other contaminants will impact the hardware's ability to be properly torqued so keep all hardware clean and in good condition. If a bolt is ever found to have been loose or damaged after grinding, properly replace that tip's bolts and nuts immediately.

Nuts with flanges and nuts with top-lock provisions torque differently than standard style nuts. Factor all hardware details into determining proper torque, and make sure that proper tension is actually achieved as torque value is only an indirect indication of tension.

HAMMERS & HOLDERS:

Hammers come in many variations, and some machines may be capable of being equipped with multiple hammer variations under the correct circumstances. **Not all machines are capable of accepting variations from their original design.**

Swing Hammers (typically installed with a single retaining rod to pivot on) are often designed to provide a level of relief to the mill in times of heavy grinding stress or load as they will lay back & open the gap between the cutter and the screen. This feature is intended to protect the drive system as well as all of the mill assembly components. **Note:** Swing hammer designs should not include bolt on tips as the swinging action of the hammer may damage the hardware and magnify the risk of dislodging a tip.

Rigid Hammers (typically installed solid to the mill or with a minimum of two retaining rods) do not provide relief in times of heavy grinding stress as they do not lay back. Although this style is often used in an effort to be more productive, the rigid hammer may present greater stress upon the mill drive system and all mill assembly parts including the hammer itself.

Given the nature of hammer mills and the potential of wear, stress, impact, and catastrophic events, neither style hammer is ultimately immune to damage and possible failure even when new since it is possible that catastrophic impact and stresses may be immediately present as a machine starts to operate. Factor this into maintenance, start up, operation, and thrown object safety programs.

- Become aware and understand the construction of your selected parts including the possibility that many components may be offered with material, design, and other construction variations. Within possible variations come different possible performance properties including variations in the way that a part wears and/or stands up to use and possible miss-use. As an example, materials that wear better may sometimes present the possibility of being more prone to fracture when exposed to high stress, & selecting a softer metal may be less prone to fracture but sometimes present the possibility of being more prone to flex or bend. With those factors and other possible construction and design variables, you must consider how the part will perform in the toughest situation that your application can deliver including an assessment of how the part will perform when subjected to possible catastrophic contamination or other impact.
- Be sure to factor all construction performance properties into your part selection as well as your safe machine operation and safe job site set up.



Mill Component Safety Continued

! WARNING

ONLY PROCESS GRINDABLE MATERIALS

Do not attempt to grind metal, rock, or other materials not suited for grinding. Attempts to process material not suited for grinding may cause material ejection, damage to the machine, injury, and/or death. Inspect material fully to be sure that only material suited for grinding is loaded into the machine.



! WARNING

Before Powering Mill, make sure that all mill parts clear without contacting other parts in the mill assembly and provide original machine manufacturers recommended clearance.

- In order to avoid major property damage, injury, and/or possible death when using hammermills, consider the real possibility of an actual catastrophic event and be forward thinking. Be sure that all technicians, operators, bystanders, and the entire work area are focused on safety and properly equipped to handle any situation including possible material contamination of materials that cannot be ground, catastrophic contact of components in a mill, and possible material ejection from a machine.
- Never operate a mill without retaining floor, hood, lid, shear bar, anvil, or other designed retainer in place over screens.
- Never use hardware that is the wrong type, size, or grade.
- Most bolt-on tip applications require a grade 8 or higher, but check with the machine manufacturer and the tip supplier and follow their recommendations.
- The hardware size requirement for the hammer shank must match the tip.
- Ultimately, all hammer, tip, hardware, screen, and other mill component variations must be approved by their supplier as being acceptable for use in the application prior to them being used, and your machine manufacturer must approve both your application and your mill part configuration
- Only grind with mill components approved for your application.
- Do not use multiple piece hammer weldments where the hammer shank is welded to the base mount of the hammer unless the machines original manufacturer approves this type of construction. One Piece metal construction is best and required in most applications.
- If the mill contacts any hard ungrindable material, stop & inspect the mill immediately.
- Any area of the mill that contacts hard ungrindable material needs to have new hardware properly installed as well as good mill component condition confirmed.
- The hammers also need to be inspected with the tips. For bolt-on tip style hammers, the surface where the tips bolt on must be kept free of wear for a good tip to hammer fit. Any worn or damaged hammer needs to be replaced.
- Properly maintain all grinder parts with special attention to the hammermill assembly. All components of the machine must function properly together as a unit, and a problem in one area may impact other areas of the machine. Do not grind with mill out of balance, significant vibration, unusual noises, or other signs of problems in the machine.
- Mill assembly wear and damage can result in the particulate that has been separated from the mill components being discharged with ground material. Factor for the presence of particulate from mill wear, mill machine damage, and possible other contamination in the handling and future use of the ground material. Additional equipment and/or machine options may be required to properly manage this based upon the specific application.
- Processors of feedstock such as hay, grain, etc., must give special attention to the management of discharged particulate from mill wear, mill machine damage, and other possible contamination that may result in a risk of possible end use problems including the potential of hardware disease (Bovine Traumatic Reticuloperitonitis).
- No materials, components, or machinery produced by CW Mill Equipment Co., Inc. are to be used in the production of food for humans without specific written notice from CW Mill.
- Use great care in handling new and used mill components as sharp edges and points may exist, and some components may be very heavy.
- Worn, damaged, or malfunctioning components may cause sparks, heat, and other fire hazards. Once heated, an object may become a source of ignition if it comes in contact with flammable material such as possible processed material passing through the machine including the discharged stock pile. Factor this hazard into fire prevention procedures.