

# Bearing Heater: Safe Use & Selection



Simply better.



## Industrial Tool Safety & Bearing Heater Selection

Employers are responsible for maintaining in good repair any tools and equipment supplied to workers. Workers must use tools and equipment properly and report any defects to supervisors. Tools and equipment should be inspected regularly. Use the guards and personal protective equipment which we all know are needed but sometimes tend to overlook. **Never** disable, for the sake of convenience any built in safety features or guards on tools. Basic hazard awareness and common sense can prevent serious injuries with industrial hand and power tools.

**Common Causes of Accidents** - Typical causes of hand and power tool accidents include the following:

- Using the wrong tool for the job
- Tools falling from overhead
- Sharp tools carried in pockets
- Using cheaters on tool handles
- Excessive vibration
- Failure to support or clamp work in position
- Carrying tools by hand up or down ladders

### Safe practices for the industrial work place

- **Use the right tool for the job.** Using a clamp to lift, using a cheater bar on a handle or, using pliers instead of a proper wrench are typical examples of the mistakes which commonly lead to accidents and injuries.
- **Use tools as recommended by the manufacturer.** For example, don't use cheaters on handles. This will exert greater forces on the tool than it was designed for and is likely to cause breakage and possible injury.
- **Damaged or broken tools should be removed from service.** Clamps with broken pads, bent handles, corroded pads, snips with notched blades, bent clamps, damaged spindles etc. are all unsafe and should be removed from service and be either repaired or destroyed.



- **Maintain tools in safe operating condition.** Keep handles, pads and spindles clean, secure and safe. Don't rely on friction tape to secure split handles or to prevent handles from splitting. Check wedges and handles frequently. Keep handles smooth and free of rough or jagged surfaces. Replace handles, spindles, blades and pads that are split, corroded, or that cannot be refitted securely.
- **Never climb ladders with tools in your hand.** Tool holders / pouches free your hands while climbing or working on ladders, scaffolding, and other areas where access may be difficult. When carrying tools up or down from elevated places, put them in substantial bags or boxes and raise and lower them with strong ropes.
- **Spark-resistant tools** (non-ferrous tools) are recommended where flammable materials or explosive dusts or vapors might be present. These tools, such as brass or copper hammers or mallets, should still be used with caution; remember, they may not guarantee safety in all explosive situations such as in the presence of gasoline vapors. It is always safer to eliminate the hazard by ensuring a safe atmosphere through isolation, ventilation, or purging.
- **Protect the cutting edges of tools when carrying them.** Carry them in such a way that they won't be a hazard to yourself and others. Carry pointed or sharp edged tools in pouches or holsters.
- **Keep your hand tools clean.** Protect them against damage caused by corrosion. Wipe off accumulated dirt and grease. Dip the tools occasionally in cleaning fluids or solvents and wipe them clean.
- **Lubricate** adjustable and other moving parts to prevent wear and misalignment.
- **Stay aware of your surroundings** – look around and keep a mental note of what is going on around you. Identify & be mindful of potential dangers.
- **Falling tools** are a dangerous hazard for workers below. Keep track of tools, especially when working at heights on scaffolds or other access equipment.

- **Inspection and Repair of Industrial Tools** - Tools should be inspected by a person qualified through training and experience to determine the safe condition of the tool. Worn or damaged tools should be tagged “**DEFECTIVE – DO NOT USE**” and returned to the shop for repair or replacement. Regular inspection of all tools is necessary and should cover tool maintenance. Observing proper handling and storage of tools should also be a part of the inspection process. Responsibility for inspection is usually left to the supervisor; however, tools should be checked by those who use them daily. Hand tools that get the heaviest use and abuse should be inspected frequently. To maintain and repair tools properly requires the right facilities and equipment. A good workbench, repair tools, vises, and good lighting are necessities. Only persons skilled in the repair of tools should be allowed to do the repairs.
- **Misuse** - Misuse of hand tools is a common cause of injury in the work place. In many cases, the injury results because it is assumed that everyone knows how to use most common hand tools. This is not the case. It is the responsibility of the supervisor and employer to ensure that workers are trained in the safe and proper use of hand tools.

### Personal Protection

**Hands** – Hands can be caught in machines, crushed by objects, or cut by sharp-edged tools such as chisels, knives, and saws. Hands can also be damaged by being burned, fractured, or sprained unless you stay alert. Always wear protective gloves appropriate to the job being done.

**Feet** – Always wear the correct protective footwear for the job (Steel toed, rubber, leather etc...)

**Eyes** – Eyes are highly susceptible to injury; however, most eye injuries are preventable. Always wear appropriate safety glasses / face shields for the job.

**Ears** – Hazardous noise levels are inherent in industry. Hearing protection should be worn whenever there is a risk of excessive exposure.

## Safe Use & Selection of Industrial Bearing Heaters

### Hot Mounting

- Generally, it is not possible to mount a larger bearing when it is cold so, some kind of differential in temperature has to be undertaken to allow an accurate fit. One part can be heated, one part can be cooled or, one part can be heated AND the other part cooled. This creates a size differential and allows a **precise** placement of the bearing **without risking damage** to the shaft (if done correctly and within tolerance).
- Consult the technical specifications of the bearing manufacturer to define what the temperature differential shall be for mounting a specific bearing safely. This will usually depend on the diameter of the bearing. A bearing that is only 0.001" out of alignment can have its lifespan reduced by as much as 50% so, attention to manufacturer specifications is critical.
- Hot mounting is suitable for all medium to large straight bore bearings and for small bearings with cylindrical seating arrangements.
- Normally a temperature differential of 150 degree F between the shaft and the bearing provides sufficient expansion to effectively mount a bearing. Bearings should not be heated above 250 degrees F as it will affect the metallurgical properties of the bearing unit and may change the absolute size permanently. Standard ball bearings fitting with seals or shields should not be heated in excess of 210 degrees F because of the grease and oil sealants.
- Bearing heaters often come with a choice of cross bars (and others that can be purchased). The largest cross-bar that will fit the bearing should always be used. It allows for more rapid heating and a lower AMP draw.
- Bearing heaters sometimes have optional raising blocks for larger sized bearings. Adding a level of raising blocks will increase time to heat by approximately 20% for a given bearing size.

### Methods for Heating

- Heat transferred from an external source e.g. open flame, hot element, hot oil bath etc...
- Heat generated within the bearing itself via magnetic induction.
- Whatever method is used, localized heating should be avoided at all costs.

### Proper selection

- Use common sense when choosing your heating method. Many of the heat transfer methods are a safety hazard and should not be used.
- Reasons for choosing a cone style heater:
  - Lower up front cost.
  - Safest to use of the heat transfer methods (provided all safety precautions are followed)
- Reasons for choosing a magnetic induction style heater
  - Most efficient heating method.
  - Very safe to use (provided all safety precautions are followed).
- Consider the size & tolerances when choosing a heating method.
- Many models of bearing heater have versions for use with different voltages commonly used as industrial power supplies. Minimize your installation costs by choosing a unit that matches your current power supply – consult a qualified electrician.

### Safe & proper use

- Always check the bearing manufacturer's specifications regarding correct temperature & never exceed.
- Always follow local electrical codes regarding power supply hook up / wiring & use a qualified electrician.
- Pay close attention to voltage & amperage ratings and cycle times as indicated on the unit's faceplate.
- Always wear appropriate protective gloves when handling hot bearings.
- Do **NOT** leave unattended while in use.
- Closely monitor bearing temperature while in operation.

Always follow included instructions.

- Do **NOT** operate bearing heaters in gaseous / explosive atmospheres. When in doubt have atmosphere tested before operating.
- Do **NOT** operate bearing heaters around combustible materials, flammable liquids or any other hazardous materials.
- To help avoid electrical shocks:
  - Do **NOT** operate in or around water or any damp, wet locations.
  - Do **NOT** operate if power cord or connector show any signs of damage such as cuts, cracks etc.
- Keep bearing heaters & work area clean & dry.
- When using magnetic induction bearing heaters:

- A strong magnetic field is created in their immediate vicinity. This magnetic field may disrupt pacemakers. If you have a pacemaker, do **NOT** operate or approach to within 15 feet when bearing heater is in operation.
- May disrupt magnetic data storage media such as hard drives etc...
- Other computer components and sensitive electronic equipment may also be affected. Check with the manufacturer of your equipment when in doubt.
- Mechanical watches should not be worn while operating the unit.
  
- When using your magnetic induction heater:
  - **Always** use the largest available crossbar that will fit through bearing.
  - Do **NOT** place it on a steel table, bench or cart.
  - Do **NOT** place near large steel masses such as support columns & machines.
  - Make sure it is raised at least 18 inches above any heavily “re-barred” concrete floor.
  - All of these above mentioned items will “soak up” some of the heat inducing magnetic energy being created -resulting in longer heating times.
  - Large diameter bearings do not need to be in direct contact with the cross bar. They can sit on top of the machine between the upright columns.
  - Raising blocks are only required when the race of the bearing is thicker than the height of the uprights, thus preventing the cross bar from making contact with both of them.
  
- When using cone style bearing heaters:
  - Do **NOT** operate on any surface that may melt or burn.
  - Always place on a solid, flat surface.
  - Keep work area clear of combustible materials.
  - To prevent accidental burns, always place safety guard over heating element immediately after removing heated bearing.