



Standard Operating Procedures of Hand Tools

Introduction

To safely use each tool in Ideation Station, follow the standard operating procedures below. Every hand tool in Ideation Station is listed and described in this document. If you are unsure how to use any of the hand tools in the Ideation Station, please refer to this document or ask a lab technician for assistance.

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Striking Tools

Ball-Peen Hammer



About:

The head is made of heat treated forged high carbon steel that is harder than a claw hammer. The round “peening” end is used less in metalworking than it used to be, but it is meant to work and shape malleable metals.

Do:

- Wear safety glasses
- Hold onto the rubber grip with your dominant hand
- Place your work piece on a hard surface
- Check your surroundings to make sure you won't hit anyone when you swing the hammer
- Swing with your whole arm and elbow
- Hit your work piece squarely with the head of the hammer
- Use this tool to strike punches and chisels and to peen and form sheet metal

Do not:

- Strike with the sides, top or bottom of the hammer
- Use this tool to strike nails

Dead Blow



About:

Dead blow hammers are specialized striking tools used to minimize damage to a part's surface. The head of a dead blow is polyurethane and is with sand or lead shot to absorb the impact of the strike.

Do:

- Wear safety glasses
- Use this tool to dislodge stuck parts
- Use this tool if a steel hammer head would damage the surface of your part

Do not:

- Use this tool to hammer nails into wood

Rubber Mallet



About: The rubber Mallet is used in woodworking or when a softer impact is required. The rubber head ensures that the face of the surface you are striking will not be damaged.

Do:

- Wear safety glasses
- Use this tool to join tight fitting parts together
- Use this tool to form sheet metal

Do not:

- Use this tool to hammer nails into wood

Claw Hammer



About:

The claw hammer is the tool most people think of when they think of hammers. The head of this tool is used for driving nails into wood and the claw on the back is used to pry nails out of wood.

Do:

- Wear safety glasses
- Check to make sure no one is in the way of your swing before you use the hammer

Do not:

- No special instructions to date

Deburring

Deburring Tool



About:

The deburring tool consists of a handle and a free spinning steel deburring blade. Use this tool to remove burrs from metal and plastic edges and the insides of holes.

Do:

- Wear safety glasses
- Hold onto the handle
- If deburring the inside of a hole:
 - Insert the cutting blade into the hole
 - Move the cutting blade along the perimeter of the hole until all of the burrs are gone
- If deburring an edge:
 - Place the cutting blade against the edge of your work piece
 - Move the blade along the edge until all burrs are gone
 - Always push the cutting blade away from your body
- Replace the cutting blade if it gets dull
- Use pliers to remove any stuck burrs.

Do not:

- Use this tool on wood
- Use your hands to remove any stuck burrs.

Files

Flat



About:

A flat file is a fine cutting tool with two wide flat faces and two skinny flat faces that can remove small amounts of material from wood, plastic, or metal. It is used to break sharp corners, remove burrs from a work piece, or smooth out the surface of a work piece.

Do:

- Wear safety glasses
- Clamp your work piece to a workbench or in a vise
- Hold onto the file's handle with your dominant hand and hold onto the end of the file with your other hand
- Apply moderate downward force and push the file forward on the work piece
- Continue using forward strokes of the file to remove material
- Clean the teeth of a clogged file with a file card

Do not:

- Use backward strokes. The teeth are angled forward and will not remove any material on backward strokes

Half Round



About:

A half round file is a fine cutting tool with one flat face and one rounded face that can remove small amounts of material from wood, plastic, or metal. It is used to break sharp corners, remove burrs from a work piece, or smooth out the surface of a work piece. A half-round file can be used to file the insides of holes and inner radii.

Do:

- Wear safety glasses
- Clamp your work piece to a workbench or in a vise
- Hold onto the file's handle with your dominant hand and hold onto the end of the file with your other hand
- Apply moderate downward force and push the file forward on the workpiece
- Continue using forward strokes of the file to remove material
- Clean the teeth of a clogged file with a file card
- Use the rounded face to file inner radii and the insides of holes

Do not:

- Use backward strokes. The teeth are angled forward and will not remove any material on backward strokes

Round



About:

A round file is a fine cutting tool with a cylindrical shape that can remove small amounts of material from wood, plastic, or metal. It is used to break sharp corners, remove burrs from a work piece, or smooth out the surface of a work piece. A round file is primarily used to file the insides of small holes and small inner radii.

Do:

- Wear safety glasses
- Clamp your work piece to a workbench or in a vise
- Hold onto the file's handle with your dominant hand and hold onto the end of the file with your other hand
- Apply moderate downward force and push the file forward on the workpiece
- Continue using forward strokes of the file to remove material
- Clean the teeth of a clogged file with a file card
- Use the file to file inner radii and the insides of holes

Do not:

- Use backward strokes. The teeth are angled forward and will not remove any material on backward strokes

File Card



About:

A file card is a brush with stiff bristles often made of metal used for cleaning a clogged file.

Do:

- Wear safety glasses
- Look at the teeth of the file you are using to see if they are clogged
- Brush along the grooves of the teeth
- Check to make sure that the file's teeth are unclogged before you are finished

Do not:

- Brush down the length of the file. If you do this, the bristles will not be able to clear any debris and your file will still be loaded and unusable.

Knives

X-Acto Knife



About:

X-Acto is a brand name for a variety of cutting tools and office products. Cutting tools include hobby and utility knives, saws, carving tools and many small-scale precision knives used for crafts and other applications.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Magazine Knife



About:

A magazine knife is a knife used for general or utility purposes with snap-off blades for quick blade replacement.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Abrasives

Sand Paper



About:

Sandpaper is a heavy paper with abrasive material attached to its surface.

Sandpaper is part of the "coated abrasives" family of abrasive products. It is used to remove small amounts of material from surfaces, either to make them smoother (for example, in painting and wood finishing), to remove a layer of material (such as old paint), or sometimes to make the surface rougher (for example, as a preparation to gluing).

Do:

- Wear safety glasses

Do not:

- No special instructions to date

Orbital Sander



About:

An orbital sander is a handheld power tool that is used for smoothing or polishing surfaces using sandpaper. Round sheets of sandpaper are attached to the sanding disks.

An orbital sander is good for fine sanding or removing small amounts of materials.

Do:

- Wear safety glasses
- Take care when sanding small parts (don't hold with hands)
- Stand on the side of the disk that is rotating downward
- Hold your part against the table when sanding
- Use care when sanding plastic to avoid melting it

Do not:

- Use this tool to hammer nails into wood cut materials that make fine powder (if you need to, wear a mask)
- Let fingers get too close to the sandpaper
- Push too hard, let the tool do the work

Detail Sander



About:

A detail sander is a power tool that uses a small vibrating head with a triangular piece of sandpaper attached. This Detail Sander sands, buffs, cleans, polishes and removes rust from a wide variety of materials. A detail sander can be used for sanding corners or very tight spaces.

Do:

- Wear safety glasses
- Stand on the side of the disk that is rotating downward
- Hold your part against the table when sanding
- Use care when sanding plastic to avoid melting it

Do not:

- Use this tool to hammer nails into wood cut materials that make fine powder (if you need to, wear a mask)
- Let fingers get too close to the sandpaper
- Push too hard, let the tool do the work

Dremel



About:

Dremel is a rotary tool that rotates a bit at a high speed. The Dremel uses its speed as opposed to torque to get the job done. By inserting an appropriate bit (or burr) the tool can perform drilling, grinding, sharpening, cutting, cleaning, polishing, sanding, routing, carving, and engraving.

Do:

- Wear safety glasses
- No special instructions to date

Do not:

- No special instructions to date

Measurement and Level Tools

Tape Measure



About:

A tape measure is a portable, easy to use, measurement tool that is typically accurate to the nearest 1/16".

Do:

- Use this tool for quick measurements that don't need to be very accurate

Do not:

- Use this tool to measure tightly toleranced parts

T Square



About:

In the picture above, the grey plastic part of the T-square is called the head and the metal part with the scale is called the blade. The head and the blade of a T square are perpendicular to each other. T-squares are used to draw horizontal lines in manual drafting. They can also be used to layout cut lines on drywall and plywood.

Do:

- Use this to layout horizontal lines when doing manual drafting
- Use this mark cut lines on drywall, plywood, or any other material with square edges

Do not:

- Use this tool to take accurate measurements of your part

Caliper



About:

Calipers are precise measurement tools that accurate to the nearest .001"

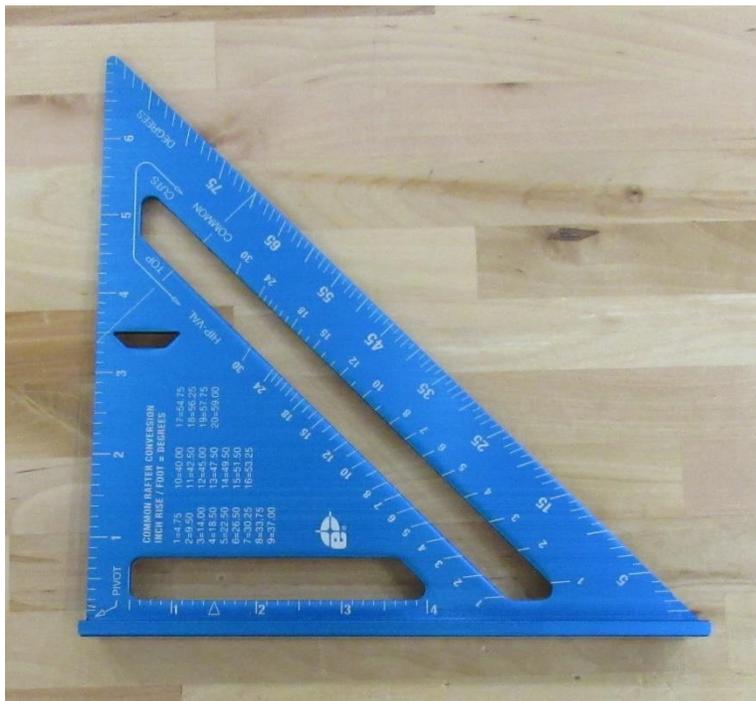
Do:

- Make sure the jaws of the caliper are clean
- Close the jaws and zero the caliper before taking any measurements
- Make sure you are reading the correct unit (millimeters or inches)
- Use this tool to take precise measurements of your part
- Use the set screw to lock the jaws to ensure your measurement is accurate
- Use the small jaws to measure hole diameters and slots
- Use the bottom of the tool to measure depth
- Turn the display off before putting the caliper away

Do not:

- Use calipers when a tape measure will do the job
- Leave the display on when you put the caliper away
- Use the calipers to scribe lines on metal! This will ruin the calipers.

Speed Square



About:

A speed square or rafter angle square is a triangular-shaped tool that combines some of the most common functions of the combination square, try square, and Framing Square into one. It is used to make basic measurements and mark lines on dimensional lumber, and as a saw guide for making short 45° and 90° cuts. Common lines made using it include perpendicular cut marks and angles for roofs, stairways, decks. Embedded degree gradations eliminate complex trigonometry, making for speedy layout.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Scales / Rulers



About:

A ruler, sometimes called a rule or line gauge, is an instrument used in geometry, technical drawing, printing as well as engineering and building. It is used to measure distances or to rule straight lines. The ruler is a straightedge, which may also contain calibrated lines to measure distances.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Carpenter's Level



About:

A traditional carpenter's level looks like a short plank of wood and often has a wide body to ensure stability, and that the surface is measured correctly. In the middle of the spirit level is a small window where the bubble and the tube is mounted. Two notches (or rings) designate where the bubble should be if the surface is level. Often an indicator for a 45° inclination is included.

Do:

- No special instructions to date

Do not

- No special instructions to date

Inspection

Telescoping Mirror



About:

The Telescope Mirror is an articulating mirror on an extendable rod that allows the user to see around and behind objects easily.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Telescoping Alligator Clip

**About:**

This is an alligator clip on an extendable rod that allows the user to grab things and move them.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Marking

Scriber



About:

A scriber is a hand tool used in metalworking to mark lines on work pieces, prior to machining. The process of using a scriber is called scribing and is just part of the process of marking out.

The point is sharpened to an angle of 30° or 40° . Some scribers have a point at both ends. It is used by drawing the point over the surface of the work piece to leave a shallow scratch on its surface.

Do:

- Use this to scribe lines into metal or plastics

Do not:

- Use this tool for any other purpose besides scribing lines into metal

Automatic Center Punch



About:

An automatic center punch is a hand tool used to produce a dimple in a work piece (for example, a piece of metal). It performs the same function as an ordinary center punch but without the need for a hammer. When pressed against the work piece, it stores energy in a spring, eventually releasing it as an impulse that drives the punch, producing the dimple. The impulse provided to the point of the punch is quite repeatable, allowing you to make uniform impressions.

Do:

- Use this to make dimples in metal, before drilling

Do not:

- Use this tool for any other purpose besides center punching

Manual Center Punch



About:

A center punch is used to mark the center of a point. It is also used to mark the center of a hole when drilling holes. A drill bit has the tendency to "wander" if it does not start in a recess. A center punch forms a large enough dimple to "guide" the tip of the drill bit. When drilling larger holes and the web of the drill is wider than the indentation produced by a center punch, the drilling of a pilot hole is usually needed.

Do:

- Use this tool along with a ball-peen hammer for making dimples in metal before drilling

Do not:

- Use this tool for any other purpose besides center punching

Screw Drivers

Flat Head



About:

A screwdriver is a hand-tool for turning (driving) screws (and sometimes bolts or other machine elements with a mating drive system). A screwdriver is identified by its tip, which is shaped to fit, or mate with, a screw the head of which has a particular contour, or surface shape. A screwdriver is, thus, a mechanism to apply torque to a screw.

Do:

- Use this tool to install and remove flat-head screws and bolts

Do not:

- No special instructions to date

Philips Head



About:

A screwdriver is a hand-tool for turning (driving) screws (and sometimes bolts or other machine elements with a mating drive system). A screwdriver will be easy to identify by its tip, which is shaped to fit, or mate with, a screw the head of which has a particular contour, or surface shape. A screwdriver is, thus, a mechanism to apply torque to a screw.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Allen Wrenches



About:

A Hex Key or Allen Key or wrench (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive).

Do:

- No special instructions to date

Do not:

- No special instructions to date

Pliers

Slip Joint Pliers

**About:**

Straight slip joint pliers are configured similarly to common or lineman's pliers in that their jaws are in line with their handles. One side of the pliers usually has two holes that connect by a slot for the pivot. The pivot is fastened to the other side and shaped such that it can slide through the slot when the pliers are opened.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Tongue and Groove Pliers



About:

Tongue-and-groove pliers, also known as water pump pliers, adjustable pliers, groove-joint pliers, Multi-Grips, and Channel locks, are a type of slip-joint pliers. They have serrated jaws generally set 45° to 60° from the handles. The lower jaw can be moved to a number of positions by sliding along a tracking section under the upper jaw. An advantage of this design is that the pliers can adjust to a number of sizes without the distance in the handle growing wider. These pliers often have long handles—commonly 9.5 to 12 inches long—for increased leverage.

Tongue-and-groove pliers are commonly used for turning and holding nuts and bolts, gripping irregularly shaped objects, and clamping materials.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Needle Nose Pliers



About:

Needle-nose pliers are both cutting and holding pliers. They are often used by electricians and other tradespersons to bend, re-position and cut wire. Their namesake long gripping nose provides excellent control and reach for fine work in small or crowded electrical, while cutting edges nearer the pliers' joint provide "one-tool" convenience. Given their long shape, they are useful for reaching into cavities where cables (or other materials) have become stuck or unreachable to fingers or other means.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Diagonal Cutter (Soft Jaws)



About:

Diagonal pliers or wire cutters are pliers intended for the cutting of wire. The plane defined by the cutting edges of the jaws intersects the joint rivet at an angle or "on a diagonal", hence the name. Instead of using a shearing action as with scissors, they cut by indenting and wedging the wire apart.

Do:

- Wear safety glasses
- Use for cutting copper, aluminum, or other soft wires

Do not:

- Use this tool for cutting steel or iron

Bolt Cutters



About:

A bolt cutter is a tool used for cutting steel wire, small diameter bolts, and wire mesh. This device has compound hinges to maximize leverage and cutting force.

Do:

- Wear safety glasses
- Cut steel wire and bolts up to 0.2 inches in diameter

Do not:

- Attempt to cut anything larger than 0.2 inches in diameter

Retaining Ring Pliers



About:

A retaining ring is a fastener that holds components or assemblies onto a shaft or in a housing/bore when installed in a groove. Once installed, the exposed portion acts as a shoulder that retains the specific component or assembly. The retaining ring plier is a tool for installing retaining rings. Two settings, selectable by the toggle lever on the tool, allow for installation of internal or external retaining rings.

Do:

- Use this for installing and removing retaining rings

Do not:

- Use this tool for any other purpose

Hand Saws

Hacksaw



About: a fine-toothed tempered blade under tension, for cutting metal, bone, and other hard materials

Do:

- Wear safety glasses
- Use this to cut wood, metal, or plastic

Do not:

- No special instructions to date

Wood Saw



About: Handsaw used to cut wood. Manual force is needed.

Do:

- Wear safety glasses
- Use this to cut wood or softer plastics like PVC pipe

Do not:

- Attempt to use this to cut metal. You will immediately ruin the cutting teeth

Wrenches

Box Wrench



About:

A wrench (or spanner) is a tool used to provide grip and mechanical advantage in applying torque to turn objects—usually rotary fasteners, such as nuts and bolts—or keep them from turning.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Spud Wrench



About:

A steel erecting tool which consists of a normal wrench at one end and a spike (drift pin) at the other, used for lining up bolt holes (typically when mating two pipe flanges).

Do:

- No special instructions to date

Do not:

- No special instructions to date

Adjustable Wrench



About:

The most common type of adjustable wrench in use today. The adjustable end wrench differs from the monkey wrench in that the gripping faces of the jaws are displaced to a (typically) 15° angle relative to the tool's handle, a design feature that facilitates the wrench's use in close quarters.

Do:

- Use this to turn nuts and bolts, or for small plumbing work or work with other threaded pieces.

Do not:

- No special instructions to date

Socket Wrench



About:

A hollow cylinder that fits over one end of a nut or bolt head, and is attached to a ratchet handle for leverage. It generally has a six-point, eight-point or twelve-point recess, may be shallow or deep, and may have a built-in universal joint.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Electrical (Small Gauge)

Double Crimper



About:

The ratcheting double crimp tool has three nests with two crimp stations each designed for insulated terminals. ... Designed for strong mechanical and consistent crimps for both standard and reinforced (double crimp) terminals in one easy crimp.

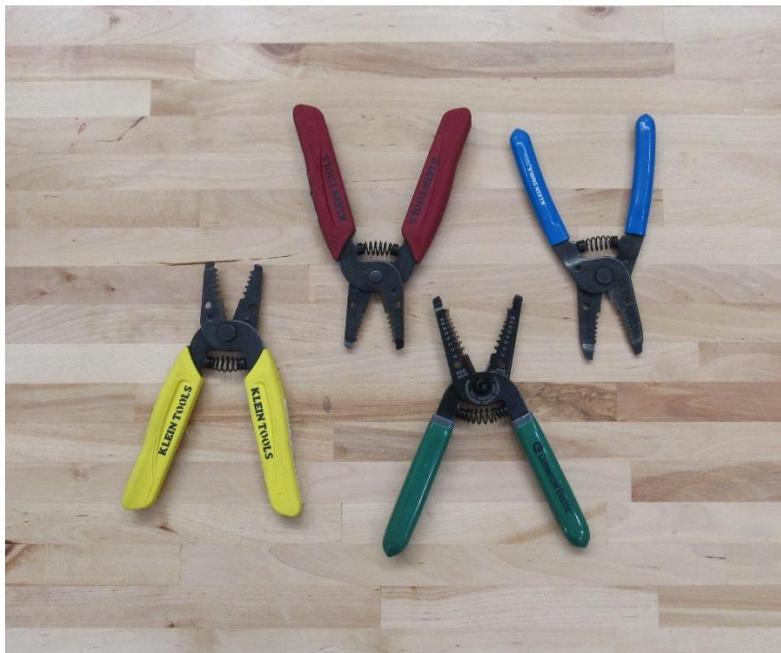
Do:

- No special instructions to date

Do not:

- No special instructions to date

Crimper/Stripper

**About:**

A combination tool used to strip and crimp typical gauge wires

Do:

- No special instructions to date

Do not:

- No special instructions to date

Cable Cutter



About:

A single-purpose tool meant only for cutting typical gauge wires made of soft metals such as copper or aluminum wires.

Do:

- Wear safety glasses
- Use this to cut copper or aluminum wires

Do not:

- Use this tool to attempt to cut steel wire, steel bolts, or any material besides soft copper or aluminum.

Wire Crimper

**About:**

Used to crimp ring lugs, quick disconnects, and other terminals onto wire.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Heat Gun



About:

A heat gun is a device used to emit a stream of hot air, usually at temperatures between 100°C and 550°C (200-1000°F), with some hotter models running around 760°C (1400°F), which can be held by hand.

Do:

- Wait for the tip to cool down before putting the heat gun back in its case.

Do not:

- Touch the hot tip of the heat gun!

Powered Drills and Screwdrivers

Cordless Driver Drill (Milwaukee 2606-20)



About:

A cordless drill is an electric drill that uses rechargeable batteries. These drills are available with similar features to an AC mains-powered drill. This driver drill has a clutch, also called a torque limiter, which aids in driving screws into various work pieces without damaging them. Read more about how to safely use this tool in the [manual](#).

They are available in the hammer drill configuration and most have a clutch, which aids in driving screws into various substrates while not damaging them. Also available are right angle drills, which allow a worker to drive screws in a tight space. While 21st century battery innovations allow significantly more drilling, large diameter holes (typically 12–25 mm (0.5–1.0 in) or larger) may drain current cordless drills quickly.

Do:

- Wear safety glasses
- Read the manual and use the torque-limiter to prevent damage to your work piece.

Do not:

- Hold this tool by one hand. Use two hands to prevent the tool from overpowering you and getting out of control

Pry Bars



About:

The pry bar is used as a lever either to force apart two objects or to remove nails. Pry bars are commonly used to open nailed wooden crates. Common uses for larger crowbars are: removing nails, prying apart boards, and generally breaking things.

Do:

- Wear safety glasses
- No special instructions to date

Do not:

- No special instructions to date

Quick Clamps



About:

This tool is composed of a fixed jaw and sliding jaw sitting on a steel bar. By squeezing the release lever, the sliding jaw may be rapidly moved along the steel bar. By squeezing the clamp lever, additional clamping force is applied. Used for rapidly fixturing work pieces or for holding wooden parts together during a glue-up.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Sheet Metal

Compound-Action Snips



About: Snips are hand tools used to cut sheet metal and other tough webs. Compound-action snips use a compound leverage handle system to increase the mechanical advantage.

Do's:

- Wear safety glasses
- No special instructions to date

Do not:

- No special instructions to date

Hand Riveter



About: This hand riveter makes use of the force applied by the user instead of the force from compressed air as in the pneumatic riveter. The hand riveter is used on the manufactured head side of the rivet and a bucking bar is used on the buck-tail side of the rivet. The energy from the user in the riveter drives the work and the rivet against the inertia of the bucking bar. As a result, the tail of the rivet is deformed and work-hardened. At the same time the work is tightly drawn together and retained between the rivet head and the broadened and flattened tail.

Do's:

- No special instructions to date

Do not:

- No special instructions to date

Masonry

Hammer Drill (2704-20)



About:

The smaller drill will do just about any drilling or driving job you need, and without the added danger of this tool. This tool is very powerful, and can quickly break free of your control. Use this only when you need to drill a hole in concrete or masonry, or when you need to hold a larger diameter shank (this tool holds up to 1/2" shank tools, while the smaller drill holds up to 3/8" shank tools).

A hammer drill is a rotary drill with a hammering action. The hammering action provides a short, rapid hammer thrust to pulverize relatively brittle material and provide quicker drilling with less effort. Nine times out of ten, you should not be using this tool. This particular hammer drill has three modes of operation, hammer drill, regular drill, or screw driving modes.

Do:

- Wear safety glasses
- Use this tool for very high-powered operations or masonry applications

Do not:

- Use this tool when the smaller, safer, easier-to-control drill will do the job

Impact Driver (Milwaukee 2656-20)



About:

An impact driver uses a series of rapid rotational impulses to drive nuts, bolts, and screws while the operator only need apply a much smaller average amount of holding force. Use only with impact bits or you will twist or break the bit.

Do:

- Wear safety glasses
- No special instructions to date

Do not:

- Use the bits from the cordless screwdriver set. You will twist or break them. Use only bits marked as impact bits, which are stronger and harder and designed to hold up to the impulse forces.

Angle Grinder (Milwaukee 6146-30)



About:

An angle grinder, also known as a side grinder or disc grinder, is a handheld power tool used for cutting, grinding and polishing.

The motor drives a geared head at a right-angle on which is mounted an abrasive disc or a thinner cut-off disc, either of which can be replaced when worn. Angle grinders typically have an adjustable guard and a side-handle for two-handed operation. Certain angle grinders, depending on their speed range, can be used as sanders, employing a sanding disc with a backing pad or disc. The backing system is typically made of hard plastic, phenolic resin, or medium-hard rubber depending on the amount of flexibility desired.

Do:

- Wear safety glasses
- Use this tool for grinding steel
- Wear pants, gloves, and a face shield to protect yourself from sparks

Do not:

- Use this tool one handed, it will quickly get out of control and cause injury to yourself or the tool

Plumbing

24 Inch Strap Wrench



About: A strap wrench is any of various types of wrench that grip an object via a strap or chain being pulled in tension around it until it firmly grips. High static friction keeps it from slipping.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Plumber Wrench



About: A plumber wrench is a pipe wrench used to rotate pipes used in plumbing. The wrench can easily be adjusted to different pipe diameters by rotating the key ring. This tool can close with significant force (without caution it is possible to dent or break the pipe) and thus does not need to engage a nut.

Do:

- No special instructions to date

Do not:

- No special instructions to date

Duct Crimper



About: Quickly crimps round duct work for fittings

Do:

- No special instructions to date

Do not:

- No special instructions to date

Pneumatic Tools

Pneumatic Pop Rivet Gun



About:

A rivet gun, also known as a pneumatic hammer, The rivet gun is a type of tool used to drive rivets. The rivet gun is used on the manufactured head side of the rivet and a bucking bar is used on the buck-tail side of the rivet. The energy from the hammer in the rivet gun drives the work and the rivet against the inertia of the bucking bar. As a result, the tail of the rivet is deformed and work-hardened. At the same time the work is tightly drawn together and retained between the rivet head and the broadened and flattened tail.

Do:

- Rivets size up to 3/16 inch
- Four rivet nose pieces include: 3/32, 1/8, 5/32, and 3/16 inch

Do not:

- No special instructions to date

Pneumatic Nail Gun



About:

A nail gun is a type of tool used to drive nails into wood or some other kind of material.

Do:

- Wear safety glasses
- No special instructions to date

Do not:

- No special instructions to date

Powered Saws

Milwaukee 2621-20



About:

A reciprocating saw is a type of saw in which the cutting action is achieved through a push and pull reciprocating motion of the blade.

The term reciprocating saw is commonly assigned to a type of saw used in construction and demolition work. This type of saw, also known as a reciprocating saw, sabre saw, or Sawzall (a trademark of the Milwaukee Electric Tool Company) has a large blade resembling that of a jigsaw and a handle oriented to allow the saw to be used comfortably on vertical surfaces. The typical style of this saw has a foot at the base of the blade, also similar to a jigsaw. The user rests his foot against the surface being cut so that the tendency of the blade to push away from or pull towards the cut as the blade travels through its cycle can be countered.

Do:

- Wear safety glasses
- Use this for low-accuracy cuts in wood or plastics, while being careful the saw doesn't run into something besides your work piece

Do not:

- Use this tool when a smaller, safer, easier-to-control saw would do the job

Jigsaw (Milwaukee 2645-20)



About:

A jigsaw is a tool used for cutting arbitrary curves, such as stenciled designs or other custom shapes, into a piece of wood, metal, or other material. It can be used in a more artistic fashion than other saws, which typically cut in straight lines only. In this way, it is similar to the rasp and the chisel. Although a jigsaw can be used to cut arbitrary patterns, making a straight cut is more difficult.

A jigsaw with a bevel function on the sole plate allows cutting angles of typically up to 45° relative to the normal.

Do:

- Wear safety glasses
- Use this tool to make cuts in wood, plastics, and even metals, by installing an appropriate blade for the material you wish to cut.

Do not:

- No special instructions to date

Drill Accessories

Forstner Bits



About:

Forstner bits bore precise, flat-bottomed holes in wood, in any orientation with respect to the wood grain. They can cut on the edge of a block of wood and can cut overlapping holes. Because of the flat bottom to the hole, they are useful for drilling through veneer already glued to add an inlay. They require great force to push them into the material. Unlike most other types of drill bits, they are not practical to use as hand tools.

The bit includes a center point which guides it throughout the cut (and incidentally spoils the otherwise flat bottom of the hole). The cylindrical cutter around the perimeter shears the wood fibers at the edge of the bore, and also helps guide the bit into the material more precisely. Forstner bits have radial cutting edges to plane off the material at the bottom of the hole.

Forstner bits have no mechanism to clear chips from the hole, and therefore must be pulled out periodically.

Do:

- Wear safety glasses
- ONLY use it with the drill press and secure your work piece tightly.

Do not:

- Use this on any metals, as you will ruin the bit.

Step Bits



About:

A step drill bit is a drill bit that has the tip ground down to a different diameter. The transition between this ground diameter and the original diameter is either straight, to form a counterbore, or angled, to form a countersink. The advantage to this style is that both diameters have the same flute characteristics, which keeps the bit from clogging when drilling in softer materials, such as aluminum; in contrast, a drill bit with a slip-on collar does not have the same benefit.

Due to its design, a single bit can be used for drilling a wide range of hole sizes. Some bits come to a point and are thus self-starting. The larger-size bits have blunt tips and are used for hole enlarging.

An additional use of the bits is deburring holes left by other bits, as the sharp increase to the next step size allows the cutting edge to scrape burrs off the entry surface of the work piece. However, the straight flute is poor at chip ejection, and can cause a burr to be formed on the exit side of the hole, more so than a spiral twist drill bit turning at high speed.

Do:

- Wear safety glasses

Do not:

- No special instructions to date