



Purcellville Woodshop Red Tool Advanced

Oliver 4255 12" Jointer

Oliver 4455 22" Planer

Oliver 4640 20" Band Saw

Oliver 5380 37" Wide Belt Sander



Oliver 4255 12" Jointer



What is it used for?

Fine, high quality woodworking requires accurate wood. The first step in ensuring accurately dimensioned lumber is the Jointer where you can *joint* (straighten) one edge of your lumber then using it as a reference you can flatten one face (wide side) of the lumber at a perfect 90 degrees. With two sides flat and square you can then use the Planer to *plane* a parallel face to the flattened side and progress to the table saw to cut the last edge square and parallel. Rabbits and bevels can also be produced on the Jointer but we have other machines in the shop that are easier and/or safer to use for those operations.



What can't I use it for?

1. Reclaimed lumber and/or Pallet wood that has not been checked with both a moisture meter and a metal detector. Reclaimed lumber and Pallet wood is processed at the member's financial risk and can only be processed in the presence of a wood shop steward who will inspect the cutter head and blades before and after use.
2. Any wood that has bark on it or is round or partially round, in other words no tree branches and no sections of log. No wet or "green" wood. Some exotic hardwoods are extremely oily and will gunk up the blades, cutter head, and tables. Don't do it.
3. Properly dried and milled live-edge lumber can be prepared on the Jointer but all the bark must be removed first.

Work Size

1. Maximum depth of cut is 1/8" but remember, lighter cuts are easier to control and produce a smoother finish.
2. Minimum size of work piece is 19"long, 3/4" wide and 1/4" thick.
3. Maximum size of work piece is an 8' long 12X12. Although a work piece this big would be awfully heavy.

PPE Required/Suggested

Safety goggles and hearing protection are required. The operator must be wearing short sleeves or else roll long sleeves up as high as possible and must not be wearing any loose clothing or jewelry. Long hair must be pinned up or tucked into a hat. Closed toe shoes are required and steel toe shoes are recommended.

Special Considerations

(ie: moving machine, infeed/outfeed clearance, interaction with other activities in shop., etc.) This machine requires the dust collector which means all people in the wood shop area will want hearing protection. Make certain everyone in the shop knows that you will be using the dust collector before you turn it on.

This machine is positioned permanently and connected to dust collection, it is not movable. Make certain that you have sufficient infeed/outfeed clearance if your workpiece is long.



Location of Main Circuit Breaker, Machine Disconnect Switch, On-Off Switch(es)

The main circuit breaker for this machine is located in the left-hand panel in the Metal Shop. In addition to the circuit breaker there is a Disconnect Switch located on the column to the left of the machine. Both the circuit breaker and the disconnect switch must be in the On position for the Jointer to work. On the control panel you must turn the key to the On position. You will then use the Green On Button and the Red Off/Emergency-Off Button to turn the Jointer on and off. Please Note; the Red Off/Emergency Off switch does not work the same as on the other machines. It does not need to be reset once it has been activated. Caution! The On-Off key switch does NOT make the machine safe! It simply prohibits the machine from staying running. If you activate the green Start button with the key in the off position the motor will run as long as you push the switch, it will shut down only when you remove your finger from the Run button.

Before Cutting

1. With power off run your hand over the infeed and outfeed tables to ensure that they are clean, free of rust and slippery. Clean and wax tables if necessary.
2. Make certain that the floor in front of the machine is clear of any obstructions and is swept clean so it isn't slippery with sawdust.
3. Verify that power is off and then carefully swing the guard back and visually inspect the cutter head for cleanliness and or broken or chipped blades. USE EXTREME CAUTION, THE BLADES ARE RAZOR SHARP! Use a scrap piece of wood to carefully rotate cutter head to inspect the other three blades.
4. Use a straight edge or square to verify that the outfeed table is exactly the same height as the cutter blades.
5. Use a square to verify that the fence is exactly 90 degrees to infeed and outfeed tables. Adjust as necessary.
6. Adjust the fence forward so that only as much of the cutter head is exposed as is necessary for the width of the cut you are making.
7. Dial in the depth of cut you want using the large hand wheel behind the infeed table;
 - a. For jointing an edge in softwood the maximum cut is 1/8".



- b. For jointing an edge in hardwoods the maximum cut is 1/16"
 - c. For jointing end grain reduce depth of cut to a maximum of 1/64" and reduce the feed rate.
 - d. For flattening the wide side of a board the maximum cut is 1/8" in softwoods, 1/16 in hardwoods.
 - e. Always use the shallowest cut that will give you the results you want. Multiple light cuts are always preferable to a few deeper cuts because you have better control and a smoother finish.
8. Determine which way the grain runs in your piece of wood. Always cut with the grain for the smoothest finish with the least tear-out and the best control.
 9. Minimum board size is 19" long 3/4" wide, and 1/4" thick.

Proper wood movement through the jointer

Feeding wood through the jointer properly is the key to getting good results.

1. Position your wood on the infeed table and make certain that it is firmly against the fence.
2. Start feeding the wood using the hand-over-hand method being certain to keep even pressure against the infeed table AND the fence.
3. As your leading hand comes within 3" of the cutter head lift it up and over the cutter head and then place it back down on the wood 3" beyond the cutter head OVER THE OUTFEED TABLE.
4. Keeping even pressure on the wood so it is held firmly against the table and the fence continue using the hand-over-hand method to advance the wood.
5. Once the wood has progressed past the cutter head and both of your hands are over the outfeed table Never go back and apply downward pressure on the wood over the infeed table. Doing so will allow your wood to "tip" or "Seesaw" over the cutter head leaving a low spot in the middle of your wood.



To make a cut

1. Turn handle on Disconnect switch to ON.
2. Verify that dust collection gate is open.
3. Turn on Dust Collector.
4. Make certain that your wood is resting on the infeed table but not touching the cutter head.
5. Make certain that you are standing squarely on both feet and are well balanced.
6. On the control panel turn the key to on and push the green on button.
7. Advance your wood into the cutter head ensuring that you are keeping downward pressure on the wood to hold it firmly against the infeed table while at the same time holding the wood firmly against the fence.
8. As the wood passes over the cutter head switch the downward pressure to the outfeed table while keeping the wood held firmly against the fence.
9. At the end of your cut when the wood is at least three inches past the cutter head and the safety guard has rotated back over the cutter head pick up your wood, take a step back from the machine and look at the cut you've just made. If it needs more planing return the wood to your starting position and take an additional cut.
10. When you are satisfied that you have a flat face turn the machine off by pushing the red Off/Emergency-Off button and turn the key to the off position.
11. Turn the dust collector off
12. Turn the disconnect switch off.
13. Close the dust collector gate.
14. Return the fence to the back of the bed and leave it adjusted to 90 degrees.
15. Clean up the machine and the area.

Tips

1. Feed with the grain to avoid tear out and ensure a smooth finish.



2. Figured wood will always exhibit some tear out because the grain is not straight. If you are getting tear out try the following;
 - a. Turn the wood end-for-end
 - b. Reduce the depth of cut
 - c. Reduce the rate of feed
3. Feed right to left only (From infeed table to outfeed table)
4. Once you've started a cut Never back up
5. 3" rule – never let your hands get within 3" of the cutter head, no matter what.
6. Hand safety - Always use a push block when possible. If not possible lift your feeding hand at least 3" before cutter head, lift it up and move it in an arc until you reacquire the wood at least 3" beyond the cutter head
7. Never remove or disable the cutter head guard
8. Never adjust fence while the cutter head is spinning

Rabbeting can be done on the jointer but it may require the removal of the guard in some cases. If this is the case then do not use the jointer for rabbeting, use the table saw or router table! Never operate the jointer with the guard removed or disabled.

Remember

Max depth of cut is 1/8"

Minimum size of wood is 19" long, 3/4" wide and 1/4" thick

Maximum size of wood is an 8' long 12 X 12 although a workpiece this size would be way too heavy to lift.



Oliver 4455 22" Planer



What is it used for?

A planer is the second tool required to make really precise dimensional lumber for fine wood working. Once you've processed your wood on a Jointer the planer makes the second face parallel to the flat, straight face you created on the jointer. It is designed to make one face of a board flat and parallel to the other face. The feed mechanism is designed to feed the wood without marring it. If you try to process lumber that is not flat and straight on one side already the wood will most likely not feed properly and any defects such as warp or twist that are present on the reference side (the side that faces down when fed through the planer) will be duplicated on the side being cut. The planer can also be used for leveling panels that were glued up of several pieces of wood. Again, be aware that the second face will mirror the reference face.

What can't I use it for?

1. Reclaimed lumber and/or Pallet wood that has not been checked with both a moisture meter and a metal detector. Reclaimed lumber and Pallet wood is processed at the



member's financial risk and can only be processed in the presence of a wood shop steward who will inspect the cutter head and blades before and after use.

2. Any wood that has bark on it or is round or partially round, in other words, no tree branches and no sections of log. No wet or "green" wood. Some exotic hardwoods are extremely oily and will gunk up the blades, cutter head and tables. Don't do it.
3. Properly dried and milled live-edge lumber can be prepared on the jointer but all the bark must be removed first.

PPE Required/Suggested

Safety goggles and hearing protection are required. The operator must be wearing short sleeves or else roll long sleeves up as high as possible and must not be wearing any loose clothing or jewelry. Long hair must be pinned up or tucked into a hat. Closed toe shoes are required and steel toe shoes are recommended.

Special Considerations

(ie: moving machine, infeed/outfeed clearance, Interaction with other activities in shop., etc.) This machine is positioned permanently and connected to dust collection, it is not movable. Make certain that you have sufficient infeed/outfeed clearance if your workpiece is long. This machine requires the dust collector which means all people in the wood shop area will want hearing protection. Make certain everyone in the shop knows that you will be using the dust collector before you turn it on.

Location of Main Circuit Breaker, Machine Disconnect Switch, On-Off Switch(es)

The main circuit breaker for this machine is located in the left-hand panel in the Metal Shop. In addition to the circuit breaker there is a Disconnect Switch located on the column to the right of the machine. Both the circuit breaker and the disconnect switch must be in the ON position for the planer to work. On and off switches are located on the left side of the machine. Use the Green On button to turn the machine on and the Red Off/Emergency-Off switch to turn it off. Note that once activated the Off/Emergency-Off switch must be reset before the planer can be turned on again. To reset the Off/Emergency-Off switch you must gently rotate the Red button a quarter turn in a clockwise direction until it clicks.



Before Cutting

1. With power to the machine turned off at the disconnect switch lower the table and run your hand over the surface to ensure that it is clean, free of rust and slippery. Clean and wax the table if necessary.
2. Make certain that the floor around the machine is clean and free of tripping hazards or sawdust.
3. Using the scale to the right of the table set the table to the thickness of your material and then dial in the depth of cut you want. REMEMBER, 1/8" is the maximum allowable cut. Shallower cuts will leave a smoother finish.
4. If your work piece is long you will want to set up a support roller or two behind the planer so your wood won't fall to the ground as it exits the planer.
5. To make using the planer easier enlist a second person to act as your helper. This person can stand behind the planer to "catch" the wood as it exits and then stack it or hand it back to you for another pass.
6. Verify that the feed lever on the left of the Planer is set to 20FPM. (slow speed)

To Make a cut

1. Verify that the table height is no less than 1/8" less than your board.
2. Open the dust collector gate.
3. Turn on the dust collector.
4. Press the Green On switch.
5. Feed your board into the machine making certain that the previously jointed face is facing down.
6. When the board exits the planer pick it up and decide whether it needs another pass or is OK as is.
7. If the board needs another pass adjust the table up by the desired amount (usually no more than 1/2 revolution of the adjusting hand wheel.) and feed the board through for another pass.



8. When you are satisfied, press the Red Off/Emergency-Off button.
9. Turn off the dust collector.
10. Close the dust collector gate.
11. Clean up.

Tips

1. If you have multiple boards to process run each board through the planer before changing the depth of cut. This way all your boards will be exactly the same thickness when you are done.
2. When you are running multiple boards through the planer always have the next board ready so it actually touches the preceding board as it follows through the planer. This will greatly reduce, or in most cases, completely eliminate snipe.
3. Slower feed rate and lighter cuts usually produce smoother finishes and less tear out.
4. If you are cutting end grain you must take very shallow cuts at the slower feed rate.
5. Be aware that the drive roller may leave marks on your wood if you attempt very, very shallow cuts, say less than 1/64"

Notes

1. We do NOT recommend running Green wood, wet wood, reclaimed wood, barn wood, pallet wood or anything other than properly dried lumber through the planer. If you are Hell-bent on doing so you are personally liable for damaged/dull/nicked blades, machine cleanup and damaged parts. Be aware that a set of knives for this planer is around \$250.00 and will likely put the machine out of service for at least a week or ten days. If you are willing to take the financial risk and are willing to experience the ire of your fellow members then you must make arrangements ahead of time for the Purcellville wood shop steward or Purcellville Site Manager to be present.



Oliver 4640 20" Band Saw



What is it used for?

Band Saws come in a variety of sizes from small handheld machines to very large machines used for cutting up logs. Our machine falls in the middle and is intended to be used in a woodworking shop on lumber that has already been dried and cut into rough dimensional sizes. It is set up to cut wood, plywood, manufactured wood products like MDF or Masonite and some soft materials like plastic.

What can't I use it for?

Metal, ceramics, things that melt when exposed to the friction of a running blade and any wood that is still wet enough or oily enough to leave sap all over the blade, tires, and table. Likewise, it should NOT be used to cut up any non-dimensional wood. In other words DO NOT ATTEMPT TO CUT BRANCHES OR OTHER WOOD THAT IS STILL ROUND. DO NOT CUT SPLIT PIECES OF



TREES UNLESS THE WOOD IS DRY, YOU HAVE A SLED FOR HOLDING THE WOOD PROPERLY AND HAVE SUPPLIED YOUR OWN BLADE SUITABLE FOR RESAWING AND ARE WILLING AND QUALIFIED TO DISASSEMBLE THE SAW AND CLEAN IT WHEN YOU ARE DONE. REMEMBER, THIS BANDSAW IS NOT A LUMBERMILL AND NOTHING YOU CAN DO WILL CHANGE THAT FACT.

PPE Required/Suggested

Eye protection, hearing protection, no loose clothes or hair, proper closed toe work shoes (steel toes are recommended)

Special Considerations

(ie: moving machine, infeed/outfeed clearance, interaction with other activities in the shop, etc.) This machine is positioned permanently and connected to dust collection, it is not movable. Make certain that you have sufficient infeed/outfeed clearance if your workpiece is long. If anyone is using the table saw ensure that your work will not interfere with theirs. This machine requires the dust collector which means all people in the wood shop area will want ear protection. Make certain everyone in the shop knows that you will be using the dust collector before you turn it on.

Location of Main Circuit Breaker, Machine Disconnect Switch, On-Off Switch(es)

The main circuit breaker for this machine is located in the left-hand panel in the Metal Shop. In addition to the circuit breaker there is a Disconnect Switch located on the column directly behind the machine. Both the circuit breaker and the disconnect switch must be in the ON position for the saw to work. You will use the Green ON Button and the Red OFF/Emergency-Off Button to turn the saw on and off. The On Button is located to your left as you face the machine, the Off/Emergency-Off Button is to the left of the On Button. Once activated, the Off/Emergency-Off button must be turned gently clockwise until it clicks in order to reset it. The On button will not function until this is done.

Choosing the correct Band Saw Blade

Many different band saw blade options are available, using the correct ones will ensure the best cut possible and the longest Band saw Blade life. In general you want to use the widest blade that will suit your purpose. This chart shows the minimum radius that you can cut with various blade widths.



Blade Width	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	
Min. Radius	5/8"	1 1/2"	2 1/2"	5 1/2"	7"	9"	

Oliver states that the 4640 Band saw can accommodate 1/4" through 1 1/4" band saw Blades that are 157" in circumference. 3/8" and 1/2" blades are often used for general purpose cutting while 3/4" and 1" blades are usually used for resawing. 1 1/4" blades tend to be thicker and therefore substantially stiffer than thinner blades and put exponentially higher loads on bearings and tires and require special procedures so 1 1/4" blades are not to be used on our saw.

Bandsaw Blades are available in a multitude of options: such things as Blade Back, Blade Thickness and Width, Tooth Set, Tooth Kerf, Tooth Pitch, TPI, Gullet, Tooth Face, Tooth Rake angle, and Tooth Material. All contribute to how well a blade cuts. It is beyond the scope of this class to delve into the intricacies of saw blade options but rest assured that someone somewhere makes a special blade for just about any sawing job. Since ours is a general wood working shop and the machines are all set up for normal cabinet shop requirements we will only discuss normal wood working blades and these are the only blades we will fit to this band saw.

Perspective

Band saw blades suitable for this band saw can vary in cost from the mid-thirty dollar range to well over two hundred dollars for a carbide tipped blade intended for resawing. Blade guide bearings (four per machine) cost around \$40.00 each and the blade guide thrust bearings are roughly \$16.00 ea. (two per machine) Replacement tires are \$96.00 each plus shipping and require four or five hours of labor over a two day period to replace. Since running the saw with the guides mis-adjusted can damage all of the above parts in a matter of moments it's easy to calculate that our cost just for parts would approach \$300.00 and likely take the saw out of service for more than a week! Reason enough to invest the time learning how to set up and use the saw properly.

Before Cutting

1. With power Off run your hand over the table to ensure that it is clean, free of rust and is slippery. Clean and wax the table if necessary.



2. Make certain that the floor around the machine is clear of any obstructions and is swept clean so it isn't slippery with sawdust.
3. Open the upper wheel compartment and check that the saw blade is centered on the upper wheel.
4. With the upper compartment open push on the left side of the blade to gauge how tight the blade is. You should just be able to push the blade to the left until it touches the saw chassis. Make note of the reading on the blade tension gauge located on the saw body underneath the upper wheel.
5. Carefully rotate the wheel by hand and watch the blade as it moves through the upper blade guides. The bearings should not turn continuously.
6. Verify that the guide bearings do not extend into the tooth area of the blade.
7. Standing behind the band saw look at the position of the blade guides and verify that they are perfectly parallel with the blade and that there is just the smallest sliver of light showing between the sides of the blade and the guide bearings.
8. Open the lower wheel compartment and inspect the lower guide assembly for the same conditions.
9. If everything looks OK close both wheel compartments.
10. Adjust the fence to your desired location.
11. You are now ready to use the saw, However, if anything above doesn't check out DO NOT USE THE SAW. Call the wood shop steward for help.

To Make a Cut

1. Turn the lever on disconnect to On.
2. Open the dust collection gate.
3. Turn on the dust collector
4. Press the Green On Button.
5. Guide your wood through the saw, LET THE SAW DO THE WORK! Trying to push the wood through the saw quickly is a surefire recipe for disaster.



6. As the wood clears the blade be sure to keep it firmly held against both the table and fence on BOTH sides of the blade.
7. Pull the wood through the last inch of cut rather than pushing it. If you must push, be certain to use a push block.

Tips

1. If you are resawing a piece of wood use the Jointer first to make certain that an edge and a face are both flat, straight, and at a right angle. This will ensure that your wood fits snugly against the fence and the table and the wood can't "rock" as you guide it through the saw.
2. Take a lot of what you see on YouTube with a large grain of salt.



Oliver 5380 37" Wide Belt Sander



What is it used for?

The wide belt sander is used for finish sanding wide panels such as cabinet doors, cabinet face frames, panels that are glued up of several pieces of wood and other wide flat panels.

What can't I use it for?

1. This sander is not intended for smoothing, leveling or thickening rough cut lumber.
2. Any material other than wood.

Work size

1. Minimum Length of workpiece is 19"



2. Maximum allowable cut is 1/32" (.031")
3. Minimum final thickness of material is 1/8"
4. Maximum thickness of material to sand is 6"
5. Maximum width of material to sand is 36"

PPE Required/Suggested

Safety goggles and hearing protection are required. The operator must be wearing short sleeves or else roll long sleeves up as high as possible and must not be wearing any loose clothing or jewelry. Long hair must be pinned up or tucked into a hat. Closed toe shoes are required and steel toe shoes are recommended.

Special Considerations

(ie: moving machine, infeed/outfeed clearance, Interaction with other activities in shop., etc.) This machine requires the dust collector which means all people in the wood shop area will want hearing protection. Make certain everyone in the shop knows that you will be using the dust collector before you turn it on.

This machine is positioned permanently and connected to dust collection, it is not movable. Make certain that you have sufficient infeed/outfeed clearance if your workpiece is long.

Location of Main Circuit Breaker, Machine Disconnect Switch, On-Off Switch(es)

The main circuit breaker for this machine is located in the left-hand panel in the Metal Shop. In addition to the circuit breaker there is a Disconnect Switch located on the column to the left of the machine. Both the circuit breaker and the disconnect switch must be in the ON position for the Wide Belt Sander to work.

Before Sanding

1. Make certain that the shop Air Compressor is running and that the system has full air pressure. Check that the gauge on the air regulator on the back of the sander reads 80 PSI.



2. Open the cabinet door on the left side of the machine and verify that the belt is properly tensioned and the tension switch is on.
3. Open dust collection gate on top of machine. Make certain that the floor around the sander is clean and swept free of sawdust and that there are no tripping hazards.
4. It is handy to enlist an assistant if you are sanding more than a few pieces of wood or the piece you're sanding is large or heavy.

To Sand

1. On the control panel turn the On/Off switch to On. The yellow light to it's right will light up showing you that the sander is on and ready.
2. Measure the thickness of your work piece. At the top of the control panel use the up and down arrows to move the table up and down until the PV display shows the thickness of your work piece.
3. Press Spindle On to start the sander running.
4. Press Feed On to start the conveyer running.
5. Go to back of the machine and adjust the conveyer speed (you can only do this while the conveyer is running) Start with the conveyer at its slowest speed.
6. Use the hand wheel or the up/down arrows to dial in a depth of cut of .005".
7. Place your workpiece on the conveyer and let the machine sand it.
 - a. Watch the Ammeter on the control panel if the needle goes into the red hit the emergency Stop Button, manually lower the table so you can release and remove your work piece and start over.
8. When your piece emerges from the back of the sander you can adjust the depth of cut and sand again or . . .
9. Turn the On/Off switch to Off position to stop the machine.

Changing the Sanding Belt

1. Press the Red Off/Emergency Off button on the control panel.



2. Open the door on the left side of the Sander and turn the tension control switch off.
3. Pull the lever with the black knob toward you and lift up to remove it from the sander.
4. Grasp the spacer block and pull it out of the sander. Place it on the black rubber mat to the left.
5. Being careful to guide the edges of the sandpaper over the whisker switch and the machines frame pull the sandpaper out of the sander. Do not lay it down, carry it over to the rack and hang it up.
6. Select a new sandpaper belt and check the inside to verify that it is the grit you want and look for the arrows that indicate which direction it should move. Make certain to put it into the sander so it will rotate in the proper direction, again, being very careful to guide it past the whisker switch and any other obstructions.
7. Once you have the sandpaper in the machine and you are satisfied that it is positioned properly turn the belt tensioning switch on. The belt will instantly tighten.
8. Close door, reset the off/emergency off switch on the control panel and resume sanding.