

Tim's Taper Tool For Barrel Tapers

Installation and Operating Instructions
For use with small combination belt & disk sanders



Assembled Taper Tool

Your taper tool is capable of making “barrel” tapered shafts. The term barrel is in quote marks because the term barrel needs to be defined as it relates to your taper tool. The original definition of “barrel” described an arrow shaft that was shaped like a barrel stave. It gently curved from a small diameter at one end to the largest diameter in the center and back to a small diameter at the other end. In contemporary times a “barrel” tapered shaft has both ends tapered, but the tapers are straight. Your taper tool does make a small curve or parabolic shape on the arrow shaft, but it does not make a barrel stave shaped shaft. You can taper one end only (single taper), or both ends of your arrow shafts, thus making “barrel” tapered shafts in the contemporary sense. A shaft when tapered at both ends is also called a double tapered shaft.

Because the taper tool is adjustable at both ends, you can taper shafts to different diameters and lengths at each end. One common “barrel” taper is $11/32$ " at the tip end and $5/16$ " at the nock end. Taper length can vary from 4" to 10" in length.

The sequence you use to taper your shafts is very important. If you do not have Tim's Taper Tool for nocks and tips you must taper the nock and tip before you barrel taper. If you do not, the nock and tip tapers will be misaligned. If you have a Tim's Taper Tool for nocks and tips it is best to taper the nock and tip after you barrel taper. Tim's Taper Tool for nocks and tips will accurately taper the nock and tip end before or after a shaft has been barrel tapered.

If you choose to double taper your shafts, taper the $11/32$ " end first, then the smaller end. If you taper the smaller end first, the rubber hose will not securely hold and rotate the shaft.

CAUTION!

BE FAMILIAR WITH YOUR SANDER OPERATIONS AND SAFETY PRECAUTIONS.

BELT SANDER PREPARATION

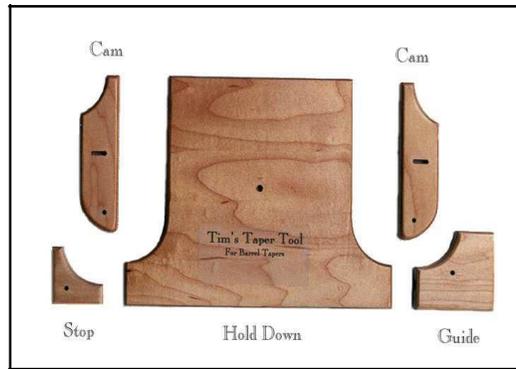
If you have not already done so, the next few steps should be followed to ensure accurate sanding of your arrow tapers. These steps may not be necessary if you own a high quality belt sander with cast iron platen, but some models have a stamped platen that is not perfectly flat. (The platen is the flat part of the belt sander.)

1. Remove the sanding belt. Inspect the splice joint on the belt. If the belt that was on your sander has a splice that is thicker than the main part of the belt, do not use it for tapering arrow shafts. Use this belt for setup and practice, but purchase a new belt that has a flush splice and is 80 - 120 grit for use on your finished shafts. Inexpensive sanding belts have a ridge where the ends are spliced, which will leave heavy scratch marks on your arrow shafts.
2. Check the platen with a straight edge for flatness. Check in several locations including corner to corner. If your platen is flat you may skip the next step.
3. It is not mandatory to have the platen totally flat, but the flatter it is the better your tapering results will be. It is an absolute must to remove any high spots on the platen. High spots on the platen will transfer to LOW spots on your arrow shafts! Use a sharp mill file for this purpose. Place the file flat on the platen and angling across the platen. File in smooth strokes lengthwise of the platen keeping equal downward pressure on both ends of the file. A hand held belt sander may also be used for this purpose if you are skilled in its use.
4. After the platen is flat, use your straight edge to check the height of the sanding drums or wheels relative to the height of the platen. The drums must be below the platen or they will sand a hollow in your arrow shaft. If your belt sander has adjustments for the wheels, make sure to lower them below the top of the platen. If there are no adjustments for the wheels the belt must be raised above the height of the wheels. The best way to accomplish this task is to use a piece of graphite cloth (available at Woodworker.com or other suppliers online) glued to the platen. The graphite cloth is recommended for all belt sanders as the graphite cloth cuts down on belt friction and heat which increases the life of the sanding belt. Glue the graphite cloth to the platen with contact adhesive. Do not use wood glues as these type glues will not work.
5. Place the sanding belt back on the sander.



Platen with graphite cloth attached

ATTACHING THE TAPER TOOL TO THE SANDER

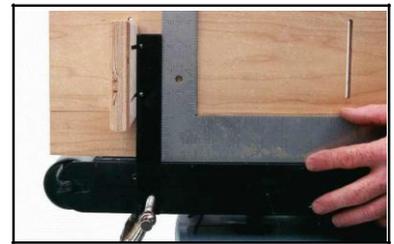


Taper Tool Parts

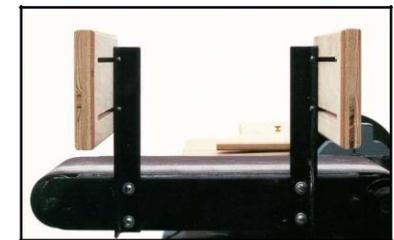
1. Attach the slotted birch pieces to the 3/4 x 3/4 angle with the 1 1/4" screws and wing nuts. Assemble the brackets to the back of the taper tool using the 1" brass thumb screws and washers.
2. Remove the arrow shaft guide and stop from the taper tool.
3. Place the assembled tool on the sander with the end of the taper tool aligned with the end of the drive wheel. Square one of the brackets, with the bottom of the 3/4 x 3/4 angle aligned with the bottom of the platen assembly. Check alignment of the tool with the drive wheel and clamp in place. Also look at the inside of the platen side to ensure you will not be drilling into any obstructions.
4. Using a 1/8" drill bit, drill the top hole through the side of the platen. Using a drill and #2 phillips bit install one 1/2" tech screw through the hole. Remove the clamp. Re-square the bracket and repeat the process with the bottom hole. If you do not wish to use the tech screw you can use a tap drill and tap to thread the back of the sander.
5. Attach the second bracket as above, being careful to square the 3/4 x 3/4 angle to the platen.
6. Attach the taper tool assembly to the sander. Tighten the screws that hold the assembly to the sander securely. Raise the taper tool about 1" above the surface of the sander and finger tighten the brass thumb screws that hold the tool to the brackets.



Brackets on back of taper tool



Squared Bracket

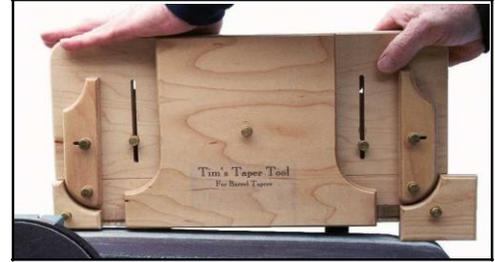


Attached Brackets

ADJUSTING THE TAPER TOOL TO THE SANDER

The next 7 steps will shape the arrow guide to your sander. Because there are many different sizes and configurations of sanders it is not practical to shape this piece during manufacturing. Make sure that the depth adjustment cams are square to the tool (as in photo below, right) and the thumbscrews are tight.

1. Loosen the thumb screw at the stop end of the tool, lower the tool at the stop end until the tool is about 1/4" above the sanding belt. Tighten the thumb screw snugly.
2. Make sure no tools or materials are laying on the sanding belt or on the disk sander platform. Turn on the sander. Make sure the belt is tracking as needed. (Follow the manufacturer's instructions.) Loosen the thumb screw holding the guide end of the tool and lower the guide end of the tool onto the belt. Push down with firm and steady but not extreme pressure. Stand to the front side of the sander and watch as the excess guide material is removed. When the edge of the tool, at the guide end of the tool, is near the level of the belt, turn off the sander. Tighten the thumbscrew.



3. Place a piece of 80 or 100 grit sandpaper under the stop end of the tool and on top of the sanding belt. Loosen the thumb screw at the stop end and lower the tool gently but firmly until it rests on the sandpaper. Tighten the thumb screw and remove the sandpaper.
4. Turn on the sander, loosen the guide thumb screw, and again gently push down on the guide end of the tool until the tool is just ABOVE the sanding belt. Turn off the sander.
5. Loosen both thumb screws and raise the tool about 1" above the sanding belt. Snug up the thumb screws. Place an 11/32" field tip under the hold down and in the arrow groove. You will need to push on the opposite corner of the hold down at the top of the tool. This job will be easier if you remove the stop prior to inserting the field tip. If you press too far on the hold down it may become disengaged from the brass alignment pins. Simply wiggle the hold down and it will reseat itself.
6. Follow the same procedure with the 23/64" field tip at the guide end.
7. Place a sheet of 100 grit sandpaper or 2-3 sheets of printer paper on top of the sanding belt. Loosen the thumb screws and lower the tool gently but firmly until the field tips are resting on the printer paper. Tighten the thumb screws firmly. Remove the field tips and printer paper. Reinstall the stop and guide. Take a deep breath, relax, and quit cussing. The hard part is done and you are ready for some fun!!



Sandpaper and tip in place

TAPERING YOUR ARROW SHAFTS - PRACTICE

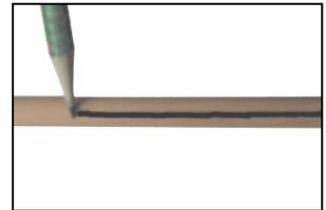
Now that you have made the necessary preliminary adjustments to your taper tool you are ready to taper some practice shafts. The adjustments you have made will taper a 23/64" shaft to approximately 11/32" and 6" to 8" long. You will want to make a few practice shafts before tapering good shafts to get a feel

for the process. You will likely ruin a shaft or two while learning and making final adjustments, but then the tapering process becomes very simple. Do not use good shafts initially. Do not use shafts that have had paint or finish applied. If you do not have “junkier” shafts, purchase a few 3/8" dowels at your local building supply or hardware store. The test shafts do not need to be straight for this process, but cannot be overly crooked. If you use 3/8" dowels, you will need to remove the arrow guide temporarily. You will also need a 3/8" variable speed electric or cordless drill. If you use 3/8" dowels you may place them directly in the drill chuck. If you use arrow shafts, use the aluminum and rubber arrow holder.



Practice! Practice! Practice!

It is difficult to see how much wood is being removed from a bare shaft. It is very helpful if your test shafts have been stained a dark color, as it is very easy to see how much wood is being removed during the tapering process. You can also mark the shafts with a pencil from about 12" to 4" from the end as seen in photo at right.



Carefully follow the remaining directions and you will be tapering arrow shafts in no time.

1. Place the rubber and aluminum arrow holder into the drill chuck and tighten. Slip an arrow shaft into the rubber tubing. Turn on the sander. Start the shaft through the arrow guide and begin rotating the shaft with the drill as soon as the shaft enters the guide. The rotation speed should be about 400 - 600 RPM. Do not spin the shaft at full speed on an electric drill as that will cause heat buildup and excessive wear to the taper tool. As the shaft continues to rotate, push the shaft until it contacts the stop. Continue to rotate the shaft and slowly withdraw the arrow shaft from the taper tool. Turn off your sander and examine the taper on your arrow shaft. **CAUTION!** If you do not keep the arrow shaft spinning during the entire process, you will flat spot the shafts, and they will stay flat spotted. No further sanding will take out the flat spots. Not to worry. This is just practice. If the shaft has become flat spotted, cut off that portion and taper it again.
2. Practice tapering several shafts or dowels. For practice, taper both ends of your shafts. If necessary, cut an inch off the shaft and taper again. Taper enough practice shafts or dowels until you are comfortable with the tapering process.

TAPERING TO 5/16"

1. If your practice arrow shafts are tapered to 11/32", your adjustment at the stop end of the taper tool is complete. If not, move the taper tool closer to or farther away from the sanding belt by loosening the thumb screw that holds the tool to the guide, and slowly raise or lower the tool. Move the taper tool in very small increments, and taper again following the above instructions. Continue this process until you are satisfied that the end diameter of the shaft is 11/32".
2. Loosen the thumb screw above the slot on the adjustment cam at the stop end of the taper tool. Turn on your sander. Move the cam about half way on the slot. Tighten the thumb screw. You will be removing material from the STOP END of the taper tool. This process is necessary to enable you to taper shafts down to 5/16"

3. Insert an arrow shaft in the tubing and taper the shaft again. Examine the shaft for diameter. If all previous adjustments were made correctly, the shaft will not yet be tapered to 5/16". It will still be oversized. Turn on the sander and repeat the process above, moving the cam to about the 3/4 position. Taper your arrow shaft again and examine the diameter. Your shaft should still be oversized.
4. Repeat the process of moving the cam, sanding material off of the taper tool, tapering your arrow shaft, examining for diameter, until you have the proper adjustment. Do not hurry through this process as you may remove too much material from the taper tool, rendering it unusable.
5. On completion of this process, you will be able to set the cam to "square" and taper your shafts to 11/32" and by moving the cam to the farthest angle, taper shafts to 5/16".

TAPER LENGTH ADJUSTMENT

1. Loosen the thumb screw that holds the taper tool to the bracket at the guide end of the tool. Carefully move the taper tool closer to or further from the sanding disk, tighten the thumb screw, and taper some test shafts until the length of the taper is the SHORTEST that you will want to taper. By moving the cam at the guide end of the taper tool, you can precisely control the taper length. This final step will allow you to taper your arrow shafts to any desired length up to 10".
2. Continue to practice tapering with test shafts until you are comfortable with the tapering process.
3. The tool will taper shafts that are not straight, but will not give you a good result. Take the time to straighten shafts before tapering.
4. You may want to leave your good shafts full length, barrel taper them, then cut to length and retaper the tip end.

Congratulations! You are now ready to taper your arrow shafts! Enjoy your tool, and for best results, always adhere to the following:

USE ONLY GOOD QUALITY SANDING BELTS.

USE CLEAN AND SHARP SANDING BELTS.

STRAIGHTEN SHAFTS BEFORE TAPERING.

ROTATE THE ARROW SHAFT AT A MODERATE SPEED THROUGH THE ENTIRE PROCESS, BEGINNING BEFORE THE ARROW SHAFT CONTACTS THE SANDING BELT, AND CONTINUING UNTIL THE ARROW SHAFT HAS LEFT THE GUIDE . FAILURE TO DO SO WILL FLAT SPOT YOUR ARROW SHAFTS

DO NOT TAPER SHAFTS THAT HAVE PAINT OR FINISH APPLIED. PAINT OR CLEAR FINISH WILL FILL SANDPAPER AND RENDER IT USELESS VERY QUICKLY.

USE ONLY GOOD QUALITY SHAFTS. IF YOU USE OUT OF ROUND SHAFTS, THE TAPER WILL ALSO BE OUT OF ROUND