

Power Tapered Tenon Cutters

U.S. Des. Pat. No. D639,829

Safety Rules



Caution: *Always wear safety glasses when using this tool.*

These safety instructions are meant to complement those that came with your power tool. We suggest that you reread those, in addition to those listed here, before you begin to use this product. To use this product safely, **always** follow both sets of safety and general instructions.

General Safety Rules

1. Read the manual. Learn the tool's applications and limitations as well as the specific hazards related to the tool.
2. Use common sense. If an action appears to be unsafe, it likely is.
3. Use correct power supply. **Never** use a power source for which this tool was not designed. It could cause serious injury. If the tool is equipped with a three-prong plug, it should be plugged into a three-hole electric receptacle. An adapter should be properly grounded.
4. Wear proper eye protection. Everyday eyeglasses have only impact-resistant lenses; they are not safety glasses. Also use a face or dust mask if the cutting operation is dusty. Visitors should wear the same protection.
5. Wear hearing protection.
6. Wear proper apparel. Avoid wearing loose clothing, gloves, ties, rings and bracelets as these can get caught in moving parts.
7. Long hair should be tied back and secured.
8. **Do not** work under the influence of drugs, alcohol, or medication. Drugs, alcohol, medication and lack of sleep cause impaired judgment and coordination and should not be combined with power tool operation.
9. Use in an appropriate environment. Power tools should be used only in dry, clean and well-lit environments. Exposure to rain or use in the presence of flammable liquids or gases could result in damage or injury.
10. Keep cord away from heat, oil and sharp edges.
11. Remove adjusting keys and wrenches before use.
12. Keep hands away from moving parts until they have come to a complete stop and the power has been disconnected.
13. Keep workplace clean. Cluttered areas and benches invite accidents.
14. **Do not** force tool. It will do the job better and safer at the rate for which it was designed.
15. Use the right tool. **Do not** force a small tool or attachment to do the job of a heavy-duty tool.
16. **Do not** use damaged tools. A damaged tool that does not operate correctly is a safety hazard and should be fixed before any further use.
17. **Always** disconnect the tool from the power source when changing cutters or blades, or when adjusting, cleaning or performing any other services.

18. Practice proper maintenance. Keep all tools sharp, clean and well lubricated for the best and safest results. Sharp cutters and blades minimize stalling, kickback, and burning. They perform better and safer than dull blades.
19. Repairs and service should be performed by a certified technician. Use only identical replacement parts.
20. **Do not** alter or misuse the tool. Stop any operation immediately if you notice anything abnormal.
21. Remove all nails from a workpiece before performing any operation on it.
22. Use only blades appropriate for the tool (with the correct size arbor/shank).
23. Handle blades with care.
24. Unless otherwise specified, always insert the shank or arbor of a bit (or mandrel or other accessory) as far as possible into the chuck (or collet). Then check to see if it has bottomed out, or if the radius in the corner where the shank meets the body is in contact with the chuck. In either case, raise the bit slightly to clear it so that the chuck can be tightened securely.
25. Hold or clamp workpiece firmly.
26. Maintain good balance.
27. **Do not** leave tool until it comes to a complete stop.
28. **Do not** remove workpiece or cut-off pieces from tool during a cut while the cutter is moving.
29. When not in use, power tools should be stored in a dry area, elevated and locked so that they are out of the reach of children.
30. **Never** carry portable tools by the cord.
31. **Do not** carry a plugged-in portable tool with finger on the switch.
32. **Do not** yank cord to disconnect from receptacle.

The Veritas® Power Tapered Tenon Cutters make cutting 60° shouldered tenons for rustic furniture quick, accurate and easy.

These tenon cutters are for use in a hand electric drill. They are **not** to be used in a drill press for several reasons.

1. Because the workpiece must be rigidly clamped in line with the equally rigid axis of the drill-press chuck, any misalignment or movement can create high side loads on the tenon cutter, leading to the shank failing. Any quill run-out in the drill press contributes further to the problem.
2. Because there is much less feel as to how the cutter is performing when using a drill press, it is possible to overload the tenon cutter without realizing it. This, too, can lead to the shank failing.
3. Overloading the tenon cutter or operating it at high speeds can also lead to overheating the O1 tool steel blades, resulting in edge failure, loss of hardness, and a useless blade.

Taking a Test Cut

Since different wood species and conditions yield different results, you may need to adjust the blade accordingly. **Always** make a test tenon with a scrap piece of wood of the same material as your workpiece, then check the diameter of the tenon by test fitting in a hole of the same size.



Caution: *Be aware that the blade is sharp; careless handling can result in serious injury.*

Firmly tighten the tenon cutter in the chuck of an electric drill. For the large-size tenon cutters (1 1/4" to 2" dia.) a minimum 1/2" chuck is required, and a high-torque, low-speed (~500 rpm) drill is recommended.

Clamp a piece of wood horizontally in a vise at about waist height. Use a piece no larger than the capacity of the tenon cutter to be used. (The maximum diameter of the workpiece is equal to the tenon diameter plus 1 1/2"). Ensure the end is cut square. Putting a substantial chamfer on the end of a piece of wood that is at or close to the upper limit of the tenon cutter's capacity will make starting the cut much easier.



Tip: *If you do not have a vise, you can improvise with a piece of 2x4 with various sizes of V-shaped notches cut in it and two C-clamps. Place the piece of wood in a notch slightly smaller than its diameter, and clamp the 2x4 to a bench or any stable surface.*

Place the tenon cutter on the end of the piece of wood and adjust the drill by eye so that it is in line with the piece of wood. The tenon cutter will cut tenons in line with the axis of the drill.

If you wish to have an angled tenon, clamp the piece of wood at the desired angle (using an inclinometer if necessary). Cut the tenon while holding the tenon cutter straight and level.

Note: Whether you are cutting in-line or angled tenons, the secret to cutting a uniform tenon is to keep the drill steady while cutting.

While leaning into the wood, switch on the drill at a moderate speed (500 to 700 rpm for $\frac{5}{8}$ " to 1" dia. tenons, 100 to 200 rpm for 1 $\frac{1}{4}$ " to 2" dia. tenons). Turning too fast may cause the workpiece to wander from a straight cut. If the blade is properly set, the shaving of wood will curl out of the tenon cutter as it rotates. If the tenon cutter stops cutting or does not cut at all, you will need to adjust the blade.

Adjusting the Blades

The large straight blade removes the bulk of the material and shapes the shoulder of the tapered tenon. Loosen the screws, press the blade against the body shoulder and position the blade such that the cutting edge is approximately $\frac{1}{8}$ " away from the side of the opening. Check that the cutting edge of the blade is parallel with the edge of the opening and tighten the screws.

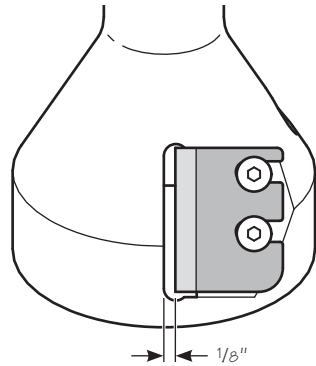


Figure 1: Adjusting the straight blade.

To Adjust Tenon Diameter

The smaller round-tipped blade cuts the finished tenon surface and determines the final tenon diameter. Loosen the screw and make small adjustments by sliding the blade in or out to achieve the desired tenon diameter.

Sight down into the cutter to see that the leading edge of the round blade just extends into the tenon bore.

Tip: A piece of wood dowel of matching diameter, or a previously cut tenon, can be used as a guide to set the round blade.

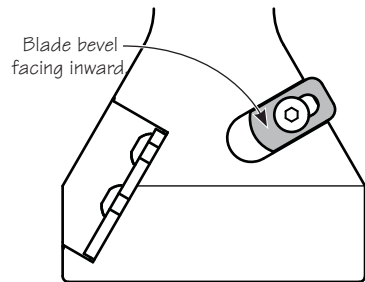


Figure 2: Adjusting the round-tipped blade to achieve desired tenon diameter.

Sharpening the Blades

Both blades are O1 tool steel and are hardened to Rc58-60. The large straight blade has a 30° bevel and the cutting edge (as supplied) is adequate for rough work in most woods; however, ease of cutting and surface finish will be improved with additional sharpening. The small blade comes with a 45° bevel ground in a curve with a $\frac{3}{8}$ " radius. While the exact radius is not critical, it is this curved cutting edge that enables the transition from the cut made by the initial blade to the finished surface of the tenon.

The blades may be sharpened by almost any method. Stones (oil or water), abrasive sheets, belt sander or power sharpening system will all provide satisfactory results. As with other blades, it is a real time saver to hone only a secondary or micro-bevel and rework the primary bevel only when required.

Troubleshooting

Uneven Tenons	This is usually caused by an unsteady drill position while cutting. Reduce your drill speed and concentrate on holding the drill steady while cutting.
Undersized Tenons	These usually indicate a blade that has been advanced too far. Back off the blade and try another cut.
Scalloped Tenons	<p>Applying excessive force while cutting the tenon can result in the cutter advancing at a rate fast enough to make the tenon look like a coarse thread. Reduce the inward force applied to the drill.</p> <p>Continuing to rotate the tenon cutter clockwise while withdrawing it from the tenon can also cause the blade to cut on its return pass, leaving similar scallops. This is especially so on green wood, where some compression may have taken place as the tenon was being cut. Instead, pull the tenon cutter off the tenon with the drill switched off, either without rotating it, or by slowly rotating it counterclockwise.</p>
Off-Center Tenons	Nothing can be done about the most common cause of off-center tenons – natural variations in wood density and growth patterns.
Partial Tenons	If the tenon cutter starts cutting, then fades and eventually stops cutting, this indicates that a minor blade adjustment is required. Slide the large straight blade in to increase the depth of cut.

Care and Maintenance

The anodized aluminum body of the tenon cutter is durable and corrosion resistant; however, the O1 tool steel blades may rust if exposed to moisture. If storage conditions are damp or humid, the tenon cutter should be wrapped in a cloth. This precaution will also guard against dings and scratches.

Periodically, or following exposure to moisture, take the tool apart to clean it. Remove the blades from the body and clean all parts using a cloth dampened with a dab of light machine or mineral oil.

Accessories

05J46.02 Power Tapered Tenon Cutter, 5/8"

05J46.04 Power Tapered Tenon Cutter, 3/4"

05J46.06 Power Tapered Tenon Cutter, 7/8"

05J46.08 Power Tapered Tenon Cutter, 1"

05J46.10 Power Tapered Tenon Cutter, 1 1/4"

05J46.12 Power Tapered Tenon Cutter, 1 1/2"

05J46.14 Power Tapered Tenon Cutter, 1 3/4"

05J46.16 Power Tapered Tenon Cutter, 2"

05J46.30 Replacement Blade, Medium

05J46.32 Replacement Blade, Large

05J46.34 Replacement Blade, Round

05J46.50 Small Countersink with 5/8" to 1" Bushings

05J46.53 Large Countersink with 1 1/4" to 2" Bushings