

Carbide-Tipped Dowel, Plug and Tenon Cutters

These cutters will cut accurate short dowels, plugs and tenons, with the cleanest possible finish and the least heat build-up while cutting. With carbide tips on the cutting spurs and rakers, they excel in hard wood or heavy use.

Caution: For use only in a drill press.

Caution: Always wear safety glasses when using these cutters.

Dowels: The inside diameter of these cutters is the nominal size, allowing you to make short dowels, which are then cut off at the shoulder with a bandsaw.

Plugs: Cutting right through the thickness of a workpiece will leave you with a round plug. Plugs 1" long or shorter will automatically side eject.

Tenons: Cutting on the ends of a workpiece and paring out the material around the projection will leave you with a tenon.

To keep your cutters in top-notch condition, they should **not** be operated at high speed because of the off-center loads induced by the single cutting tooth. **Table 1** lists the maximum drill-press speed for each cutter size.

Table 1: Maximum Drill-Press Speed (rpm)

Cutter Size	Soft Wood	Hard Wood
3/8"	2000	1200
1/2"	1600	1000
5/8"	1400	875
3/4"	1200	750
7/8"	1000	625
1"	800	500
1 1/8"	750	425
1 1/4"	700	375
1 3/8"	650	300
1 1/2"	600	250
1 5/8"	550	250

Cutter Size	Soft Wood	Hard Wood
1 3/4"	500	225
1 7/8"	550	225
2"	400	200
2 1/8"	400	175
2 1/4"	375	175
2 3/8"	375	150
2 1/2"	350	150
2 5/8"	350	150
2 3/4"	300	125
2 7/8"	300	125
3"	300	125

A slight hesitation on entry will allow the rim to fully engage with your workpiece, providing adequate support for the chipper that follows. For **soft wood** you should use a moderately high feed rate once the rim has fully engaged with the workpiece. However, because the cut is unbalanced as a result of the single chipper, the feed rate should not be so high that it will impart excessive and damaging off-center force to the cutter. When **cutting hard wood**, you should lessen up on the feed rate on account of the higher unbalanced loads to which the cutter could be exposed.

We strongly recommend that you clamp your workpiece to the drill-press table. This is especially important when cutting hard woods.

As with most cutters, you may have to withdraw the cutter to clear the chips. This is particularly important when cutting workpieces thicker than the height of the chipping face.

Sharpening your Cutters

A cutter with a dull chipper will feed erratically, run hotter than necessary, and will often plug. As received, your cutters should be ready to use. You can improve them immediately by ensuring that the chipper face is smoothly polished (even waxed) for better chip ejection. If your cutter is not clearing well, you will find that you will have to remove it from the hole frequently to clear the chips from the throat area. Because of the single chipper and the requirement for maximum rim area, these cutters have more restricted throats than just about any other kind.

Carbide-tipped cutters rarely need to be sharpened, but can still be sharpened if required, using a silicon carbide or diamond stone.

Sharpening the chipper is fairly straightforward, since you need only hone the face. You can sharpen it by using a coarse stone, followed by honing with a fine stone.

Because the chipper does most of the work, the rim rarely needs to be sharpened. This is fortunate, as this is not an easy task. You cannot touch the interior since that would change the diameter, so you are limited to honing the outside bevel of the rim with a small hand-held stone or a bench stone. Before you touch any part on the rim with a stone, place the cutter on a dead-flat surface (a glass plate is fine) and observe the height relationship of the leading edge of the chipping bevel, the leading edge of the rim, and the rim diameter that follows behind.

Note how the leading edge of the rim contacts the work surface first as it is 0.005" to 0.010" lower than the remaining rim diameter. Only when the rim diameter is sufficiently engaged in the workpiece (another 0.005" to 0.010") does the chipper begin to cut. The prior engagement of the leading edge of the rim and the rim diameter serves two purposes. First, it allows the rim to sever the tips of any wood fibers before they are removed by the chipper, leaving a cleaner plug. Second, the support of the rim diameter prevents the single-flute cutting action from throwing your workpiece off.

When stoning the rim, this relationship must be maintained. If you stone too much material from the leading edge of the rim or rim diameter, causing it to be less than 0.005" proud of the leading edge of the chipper, the bottom face of the chipping bevel will also have to be stoned. Chuck the cutter in a drill press, and lower the quill until the cutter just touches the drillpress table. Using feeler gauges, you should be able to check this relationship as you sharpen.

