

Spiral Router Bits VS Straight Router Bits

Can the old standby straight bits compete with the new, more expensive spiral bits?

BY PAT WARNER

The increasingly popular spiral router bits borrow technology from the metalworking industry. Spiral bits look like drill bits and are most often made of solid carbide, so they are super sharp and leave a superior cut on wood. Two flutes ground around the body of a spiral bit smooth vibration by spreading the cutting action over a longer edge. With their drill-like point, spiral bits are also better for plunge-cutting. All of these advantages also mean less wear and tear on the router. But don't throw out all of your old straight bits just yet.

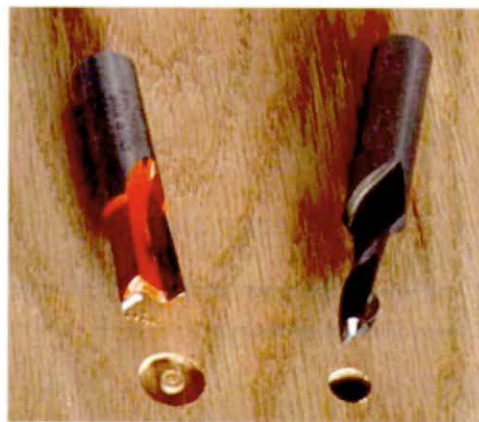
The new solid-carbide spiral bits come with some disadvantages. The first is that the cutters are expensive. A typical solid-carbide spiral bit is likely to cost at least \$50. A similarly sized straight bit with carbide-tipped cutters will run somewhere in the range of \$7 to \$23. With a cost differential that large, you will want to know what you are going to do with this bit and that you will use it often enough to get your money's worth. To highlight other differences, let's compare the qualities of spiral bits and straight bits.

Both spiral and straight bits have "plunge-ability"

You can plunge with both types of bits, so they'll both work for, say, cutting mortises. But because most spiral bits are ground on the tip end of the flute, somewhat like a drill, you can plunge straight down as far as you like, without stopping. You can't really

plunge any deeper than about $\frac{1}{8}$ in. with a typical straight bit. Inspect the end, and you'll see why (see the photo below). On most straight bits there is a space above the web, between the cutters, where no cutting takes place during a straight plunge because there is no cutter overlap. Chuck a straight bit into your drill press and plunge it into a piece of wood. After about $\frac{3}{32}$ in., the middle of the bit bottoms out. To go any farther, the bit has to abrade the wood away in this middle area.

This doesn't mean you can't cut mortises or plunge with a straight bit. You just have to sweep the router while you are plunging. You should probably cut mortises in passes not much deeper than $\frac{1}{8}$ in. anyway, but with a straight bit, such shallow passes are just about a must.



Why spiral bits are better for plunge cuts. Because a spiral bit is designed much like a drill bit, it makes plunge cuts easily. The cutters of a straight bit do not overlap, so if you plunge straight down deeper than $\frac{3}{32}$ in., you might burn away the wood in the middle, but you won't cut it.

Spiral bits leave a clean edge

The three basic cutter configurations for spiral bits are up-cut, down-cut and a combination of the two, known as a compression bit. (For more on distinguishing between up-cut and down-cut bits, see the story on p. 64.) A down-cut bit sends the chips downward; an up-cut bit sends them up toward the shank. (On a router table, all directions are reversed.) Besides directing the chips, the advantages of these configurations are best illustrated by the quality of cut, especially on veneered plywood (see the top photos on p. 64). A down-cut bit will leave a clean edge on top but a ragged



SPIRAL BITS

ADVANTAGES

- Very clean cut
- More cutter in wood means less vibration
- Better plunge-cutting
- Less wear and tear on router
- Direct chips up or down

DISADVANTAGES

- Limited lengths and diameters
- Can be somewhat risky to use

STRAIGHT BITS

ADVANTAGES

- Wide variety of lengths and diameters
- Guide bearings on tip or shank mean better template routing
- Less expensive
- Greater ability to sharpen

DISADVANTAGE

- Plunge-cutting requires more effort and skill

THERE'S NO CLEAR WINNER

Solid-carbide spiral bits are becoming increasingly popular because they make a very clean cut. But they have many limitations compared to the straight bits that have been popular for years.

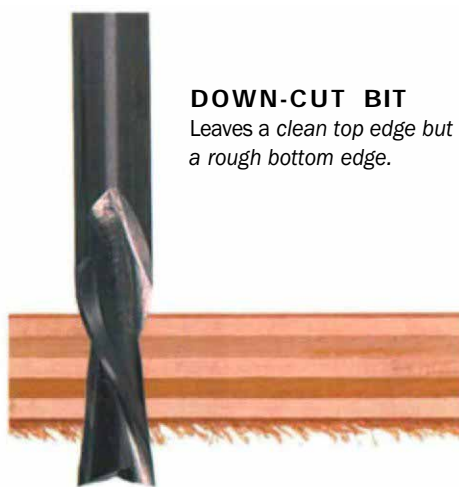
DIFFERENT CUT, DIFFERENT SPIRAL CUTTER

All spiral bits make clean cuts. This veneered plywood shows the effects of the three types of spiral bits on top and bottom edges.



UP-CUT BIT

Leaves a smooth bottom edge but a rough top edge.



DOWN-CUT BIT

Leaves a clean top edge but a rough bottom edge.



COMPRESSION BIT

Cuts both top and bottom edges cleanly.

edge on the bottom; an up-cut bit will accomplish the opposite. This is great until you want to cut a dado with no tearout on the face. A down-cut bit will leave a clean top edge, but it sends the chips downward, into the dado where they have no place to go. You can make this cut, but you have to take it slower than usual to give the chips a chance to clear.

For woodworkers who work with A-grade veneers on both sides of the stock and must have a clean edge top, bottom and middle, the compression bit is a good choice. It has an up-cut configuration on the tip of the bit and a down-cut spiral ground on the shank. By lining up the bit just right, you can get a superior edge across the entire thickness of the wood.

This virtuosity comes at a hefty price: A typical compression bit will cost about \$90.

Straight bits come in many sizes and bearing configurations

Router-bit manufacturers have difficulty making solid-carbide spiral bits with cutting diameters larger than their shanks. So for small-shop hand routers you won't find many bits with a cutting diameter larger than 1/2 in., the size of the largest bit shank. Spiral bits also come pretty much in a few standard fractional sizes up to 1/2 in. Straight bits, on the other hand, go through dozens of fractional sizes, all the way up to 2-in.-dia. cutters. Depending on the job you have in mind for your router bit, straight bits also come in a variety of cutter lengths.

So you can buy close to exactly the length of cutter you need.

Straight bits also have a huge advantage over spiral bits when it comes to template routing, because you can buy them with guide bearings. And those bearings can be mounted on the tip of the cutter or on the shank of the cutter, depending on your needs and your template. The bearings are made for a variety of cutter diameters and lengths. It is really too bad that solid-carbide spiral bits can't accommodate bearings a little more readily. With their superior edge cut, spirals make great template cutters when used with collar guides. But when it comes to bearing-guided bits, spirals seem to be available only with bearings mounted on the end of the bit. There

How to tell an up-cut bit from a down-cut bit



UP-CUT
BIT

DOWN-CUT
BIT

Let's say you have an up-cut spiral bit and a down-cut spiral bit on your cabinet shelf but haven't used them in a while. How can you tell quickly which is which?

First, look at the right side of the bit (it doesn't matter whether the tip is facing up or down). Look at what direction the flute is heading as it goes around to the back side. If the flute is moving up as it curls around the right side of the bit (as in the bit on the left in the photo), you are looking at an up-cut bit.

For a second test, hold the bit in your hand with the tip pointed down and away from you. Turn the bit in a clockwise rotation and watch the reflection of any light on the bit. If the light moves up the bit as you turn it, you are holding an up-cut bit. The light will move downward on a down-cut bit.



Down-cut spiral bits are great for dados, but go slow. Cross-grain dados can be cut with a down-cut bit (left) or an up-cut bit (right). The down-cut bit leaves a better surface, but you have to move more slowly to give the chips time to clear out of the cut.

are some problems with this: The cost is high (about \$80); it precludes cutting only partway through the work, which means full-thickness cuts only; and the template has to be under the work, an inconvenience. Shank-shod, bearing-guided, solid-carbide bits (spiral bits with the bearings on the shaft end of the bit), which would permit template routing with the template on top of the work and trim cutting through only part of the work face, are not available. For this type of routing, you'll have to stick with straight bits.

Sharpening spiral bits is difficult, if not impossible

Some woodworkers like to sharpen their straight bits, although I find it difficult to get it right and always send out my bits for sharpening. Carbide-tipped straight bits usually have enough carbide thickness to be reground four or five times, and the technology to do so is common.

A few services claim to be able to sharpen spiral bits. But I haven't found anyone who can sharpen spiral carbide to factory standards. To me, this translates into a substantial loss. Here's why: The spiral bit costs twice as much—or more—as a straight bit, and the straight bit can be reground up to five times. A sharpening service charges about \$4 to regrind a straight bit, and the cutter often comes back sharper than it was from the factory. So even if I pay \$23 for a straight bit and sharpen it five times, I still pay only \$43. Spiral bits might stay sharp longer than straight bits, but even so, the cost of using spiral bits will always be higher.

Spiral bits can be risky to use

Spiral bits work incredibly well in the production environment and especially in CNC (computer numerically controlled) router industrial applications. But in a hand router, their use sometimes imposes unusual risks not associated with the equivalent or bigger straight bits. The down-cut spiral bit's screw-driven forces are sufficient enough to pick the router up and twist it out of your hands—with no warning. I know, because it has happened to me. On end grain the spiral bit is getting even more traction, so the risk is even greater—a pity, too, because a sweet end-grain finish is attractive.

The up-cut spiral bit can have the opposite effect. It wants to pick up the work. So



Pick the best bit for the job

A clean sweep. Because of its plunging ability, a spiral bit is great for cutting mortises. You can plunge straight down, then move laterally. To plunge-cut mortises with a straight bit, you must plunge and sweep at the same time.



For pattern routing, straight bits have the right bearing. It is difficult if not impossible to find spiral bits with bearings for pattern routing, whereas straight bits are available with bearings on either the shank (above right) or cutter (above left).

you must secure the work in some kind of fixture or hold it by a clamp. (I never rout anything that is not secured or clamped, but some people do.) The up-cut bit's tendency to pick up the work also happens quickly and without warning.

My teaching and woodworking are centered on routing, so I have a cabinet filled with more than the weekend woodworker's supply of router bits. I do keep a few solid-carbide spiral bits because, when I

want a beautiful face cut or I am cutting narrow mortises, and I have the money, there is just nothing better. But my cabinet is mostly full of a wide variety of straight bits. For general-purpose work, for template and pattern routing and for those times when I need a large-diameter bit, I still reach for one of my straight bits. □

Pat Wamer stores his bits at his home shop in Escondido, Calif.