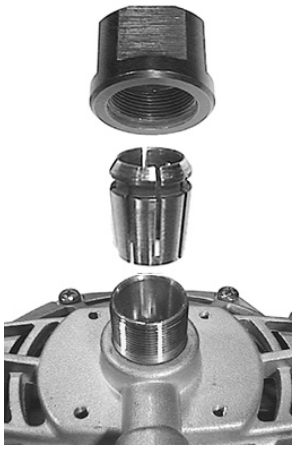
INSTALLING ROUTER BITS

Almost everybody knows that the "proper" way to install a router bit is to bottom it out in the collet, then withdraw it 1/16" to 1/8" before tightening the collet nut. Almost nobody, however, knows why. I've never seen an owner's manual divulge the secret, and I've seen the real story in print only once or twice in the last twenty years. The stuff you *have* heard is almost certainly hogwash: you pull the bit back to reduce vibration, or to decrease heat transfer into the motor spindle, or perhaps to keep fairy dust from getting in your eyes. Even though such things actually show up in print from time to time, they're entirely nonsensical.

Most of us aren't real good at following instructions whose purpose and provenance we don't understand, and I'd guess I'm not the only router user who's sometimes been a little too casual about bit installation because the rules just didn't seem very real or important. It turns out the rules are both real and important, and once you know why they're there you'll never fail to pay attention and install bits safely.



Picture a collet at work. As you tighten the collet nut, you drive the increasing taper of the collet cone into the matching decreasing taper milled into the end of the motor spindle. This squeezes the collet against the router bit shank, creating so much friction that the bit is locked in place and can't twist or pull out during operation.

If you try to make this happen while a bit is bottomed out in the spindle, however, you're asking for the impossible: the collet cone must slide along the stationary shank while simultaneously locking onto it immovably. What actually happens is that the collet grabs the shank hard enough to quit sliding, so you might not be able to tighten it further even though it's not yet tight enough to control the bit under operational loads. So when you fire up the router and start stressing the bit, it comes creeping out of the collet. This makes for exciting times in the shop, you bet, but it's not very productive.

If instead you first bottom out the bit and then pull it back a tad, you allow the collet cone to grab the shank and pull the bit along with it as both are driven deeper into the spindle, locking on tighter and tighter all the while. The story is so simple it's absolutely obvious—after you've heard it, of course. Pass it along; there's no reason for every new router owner to stumble through the same bog of ignorance and misinformation that you and I have had to put up with.

Incidentally, if you have a 1/2"-collet router which uses adapter sleeves rather than replacement collets for smaller shanks, be sure to treat the adapter exactly as if it were a bit; leave room for both bit shank and adapter to travel deeper into the collet when you tighten the nut.

Tightening the nut means just that: don't "kill it", just tighten it. Apply firm pressure with your wrench and then go away before you decide that more is better. Overtightening eventually will stretch the mouth of the spindle so it can't hold any bit securely—and when you need a new spindle you get to buy a whole new router along with it.

Having firmly established the rules, we should mention that they don't apply to several top-of-the-line current routers. A relatively new design feature has the motor spindle drilled far deeper than the usual inch or so (see our DeWalt and Makita plunge routers, for instance), so deep that it's unlikely even the longest shanks will reach bottom. This completely solves problems that would result from bottoming out, but it creates a different problem: you can't always figure out how much shank you've inserted into the collet. As a general rule, you should insert any bit shank shank to the full depth of the collet's grip (usually at least 3/4") to ensure positive control. Any less risks creeping bits, bent or broken shanks, and more unproductive excitement. An effective low-tech solution is marking a heavy black line on your bit shanks to eliminate guesswork errors when using deep-bored spindles.

Here's a related thought: if it's friction that holds a bit in the collet, then anything that reduces friction is bad news. Friction results from contact between surfaces; the smoother the two surfaces are the more contact they can share. Corrosion, dirt or damage can reduce friction dramatically. Never grab a bit with pliers to change bearings, clean it or sharpen it (the router collet is the right tool for holding a shank harmlessly, after all). If you have a bit with a scarred shank, discard it, no matter how painful the loss—it's not as painful as routing through the side of a roll top desk or catching a broken bit right in the kazoo. Do not treat shanks with oil or other coatings designed to prevent corrosion. Regularly inspect the collet, the motor spindle and your bit shanks to make sure they're clean and polished. If they need help, use nothing coarser than 4/0 steel wool, a white Scotch-Brite pad, a bronze gun bore brush or a fine Rust Eraser to clean them up.

Zach Etheridge