



Dado Blade BASICS

Dead-on dadoes, grooves, and rabbets are easy to cut when you know which type of dado blades to buy and how to use them.

While one of the most useful tools for cutting joints is a dado blade, selecting which type to buy can be a little bit confusing. To simplify it, all you need to know is that dado blades fall into three distinct categories: “wobble” blades, “V-blades,” and “stack” sets.

Wobble blades have a single blade that rides on a hub. The hub has a couple of wedge-shaped adjusters in it. As you adjust the position of the wedges, the blade actually tilts at an angle to the saw’s arbor. And, when you turn the saw on, the blade “wobbles” back and forth to make a wide cut — a dado, groove, or rabbet.

I know this sounds a little strange, but it works. And by changing the amount of tilt, you can vary the width of the cut.

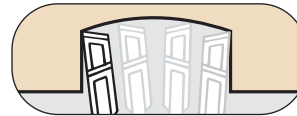
One downside of a wobble blade is that it may leave a cut with a concave bottom. This can be reduced by using a V-blade. It’s still a wobble-style, but instead it has two blades mounted on a hub. Adjusting the hub pushes the blades apart at one edge, creating a “V” that cuts a wide kerf.

Okay, now let’s get to my favorite: a stack dado set. It’s made up of two 1/8"-thick outer blades (trimmers) with additional chipper blades that can be sandwiched between the trimmers to make wider cuts.

Stack sets take a little more care in setting up, but the dadoes and grooves they cut will have clean, flat bottoms with little chipout. If there’s a downside, it’s the cost. They’re more expensive, but if you want quality dadoes, I prefer a good 8" carbide-tipped stack set.

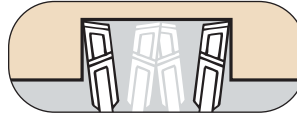
WOBBLE DADO

A single blade riding on a hub. It adjusts for different widths.



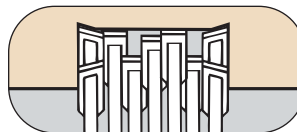
V-BLADE DADO

Two blades riding on a center hub, also adjustable.

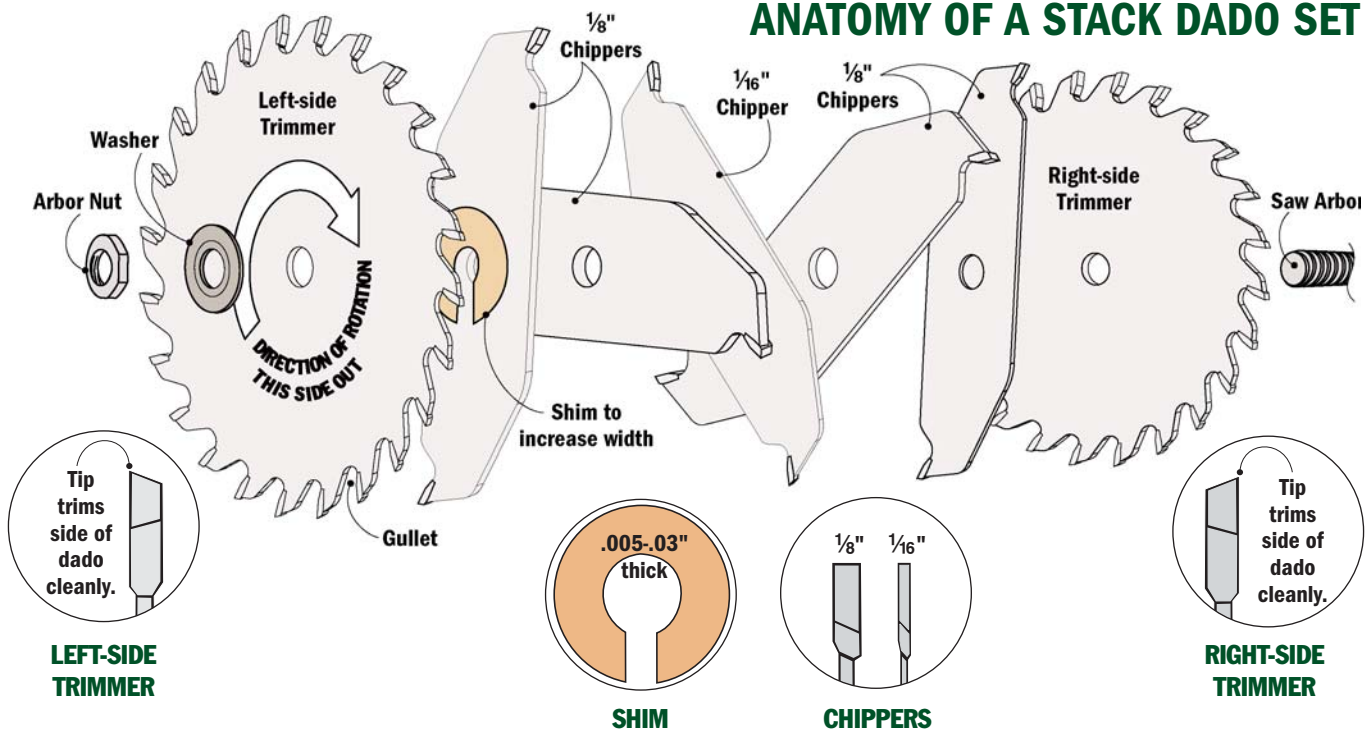


STACK DADO

Outer blades with chipper blades in between.



ANATOMY OF A STACK DADO SET



TRIMMERS AND CHIPPERS

To get the best performance from a stack set, it's important to understand how each part of the set works.

The job of the trimmer blades is to create the sides of the dados or grooves. You'll notice in the drawing above that these blades look pretty much like standard table saw blades. Each cuts a 1/8"-wide kerf. That means if you put both trimmers on the saw at once, and make a cut, you'll end up with a 1/4"-wide dado.

Now take a close look at the inset drawings above. Notice that most or all of the trimmer blade's teeth are bevel ground with the bevels slanting *toward* each other. That means there's a right- and a left-side trim-

mer blade. As long as you get the two trimmer blades oriented this way (and the blades are usually marked "This Side Out"), the teeth will cut crisp, square corners.

Placed between the two trimmers are the chippers. Depending on the manufacturer, these blades have two or four teeth each. Their job is simply to clear away the waste left between the trimmer blades.

All stack sets come with multiple chippers. You can put in just the number you need to get the desired width dado. If, for example, you stack four 1/8" chippers, and one 1/16" chipper with the two 1/8" outside trimmers, you can cut a 13/16"-wide dado. (Not so coincidentally,

that's the standard finished thickness for 1" hardwood — sometimes called 4/4 or "four-quarter.")

INSTALLING A STACK DADO SET

There are a number of things to know about installing a stack set. First, when the blades are in place in the saw, the carbide teeth of one blade shouldn't touch the teeth of the blade next to it. Not only is this hard on the teeth, but the plates of the blade won't fit together tightly.

This means the chippers should be staggered around in relation to each other as shown above. And the teeth on the chippers should be positioned next to the gullets (area between the teeth) on the trimmers.

MICRO-ADJUST USING SHIMS



When using a stack dado set you can get close to the width you want to cut (within 1/16"), but that may not be quite precise enough. One way to increase it just a hair is by slipping one or more shims in between the trimmer and chipper blades.

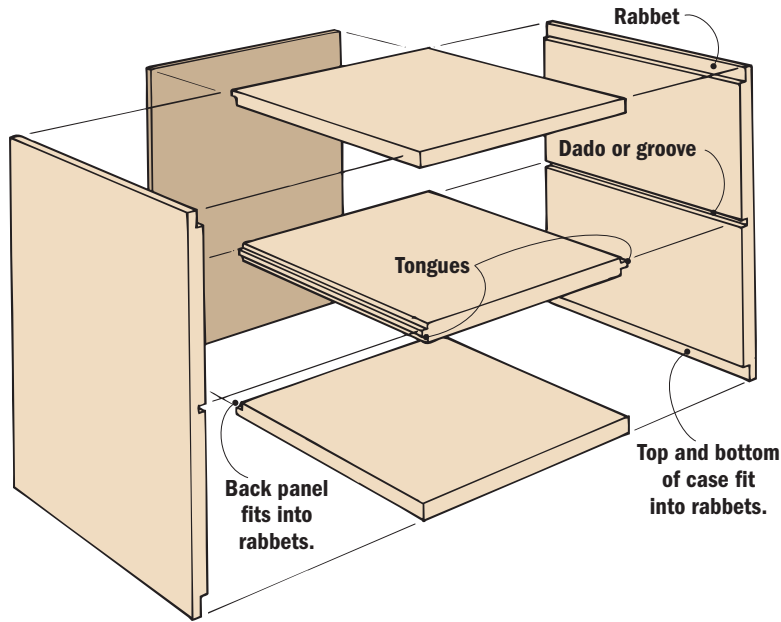
For years, I've made my own shims by cutting up playing cards, business cards, thin poster board, or kraft paper (*upper left* in photo).

Recently, I've bought some shims that are precision manufactured for thickness.

They come in two styles. Plastic shims are color-coded for thickness, with a slot cut out that allows you to fit it on the saw arbor without completely removing the blades from the saw.

Magnetic shims stick to the blades so they won't fall into the saw or between the threads on the arbor.

TYPICAL BOOKCASE OR CABINET



The next thing to consider is how many blades will safely fit on the saw. When you put all seven blades on at once, you have a lot of heavy steel flying around. So you want to make sure everything is secure.

To fit all the blades on your saw's arbor, you may have to remove the large washer. Even with it removed, the arbors on some small saws may still be too short. So for safety reasons, I never use a stack set unless I can get the *entire* nut onto the arbor.

Adjusting the exact width that you want the stack set to cut can be a challenge. You can add (or remove) one chipper at a time, but since the thinnest chipper is usually $\frac{1}{16}$ " (.0625") thick, that only gets you into the ballpark. To fine-tune the dado width, you'll need to use shims. See the box at the bottom of [page 2](#).

Adjusting the width of the dado is only half the battle. You're usually also concerned with the depth of cut. I like to start with the blade set a little low. Then I sneak up on the final height, making a test cut in a piece of scrap.

There's one last thing to consider — the throat insert. I've always found

it frustrating that most saws don't come with a metal dado blade insert. It's an optional accessory you have to buy, so I usually end up making my own. But that's not all bad since you can make an insert that will fit tight around the dado blades you're using.

ONE BLADE, LOTS OF JOINTS

Okay, once you have the dado blade set up, what can you do with it? Cut dados, grooves, and rabbets, right?

Maybe I should back up a minute and explain the difference between these terms. Both dados and grooves are channels cut out of a workpiece. The difference between them is that a dado runs *across* the grain. And a groove runs *with* the grain.

If the cut falls right at the end or edge, it's called a rabbet.

Now, take a look at the photos at right. These joints are all variations of a dado, a groove, or a rabbet and were cut with a dado blade.

Finally, take a look at the exploded view drawing above. It's a typical bookcase or cabinet with dados, tongues, and rabbets. They're all made with a dado blade.

CLASSIC JOINTS MADE WITH A DADO BLADE



DADO JOINT



RABBET JOINT



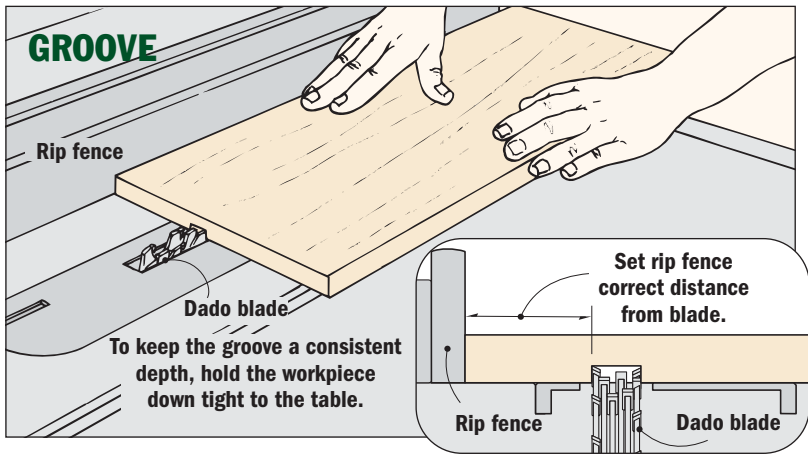
LAP JOINT



BOX JOINT



TENON (MORTISE AND TENON)

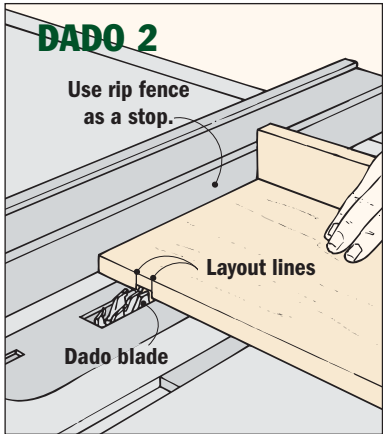
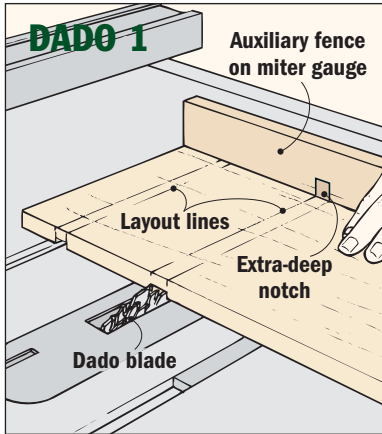


MAKING THE CUTS

Each different cut made with a dado blade requires a little different setup — and a slightly different technique.

GROOVE: Probably the simplest cut is a groove. It runs the length of a board as shown at left. The critical thing here is that the rip fence be set the correct distance from the blade.

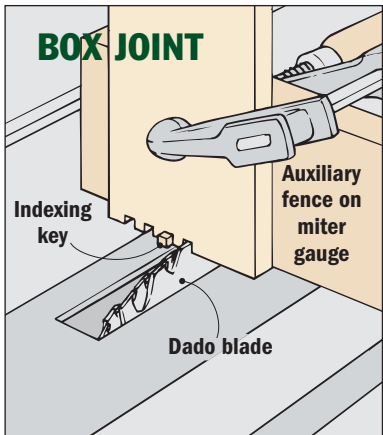
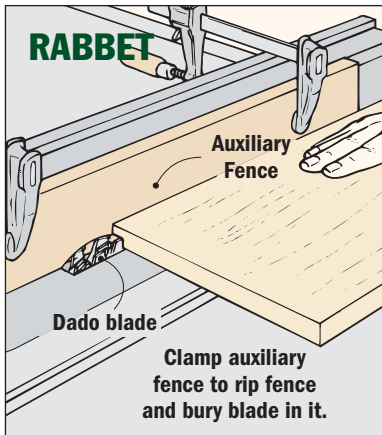
Also, when cutting a groove be sure you're working with flat stock and the workpiece is held down tight to the table. Otherwise the groove will be an inconsistent depth.



DADO: A dado is cut across the grain of a board using the miter gauge. An auxiliary miter gauge fence screwed to the front of the miter gauge helps support the board and prevents chipout.

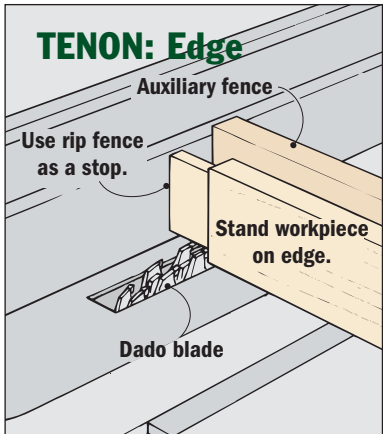
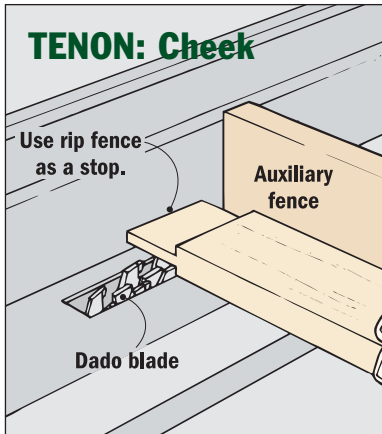
I use a couple of different methods to get the dado located in the correct position. One way is to raise the blade to cut an extra-deep notch in the auxiliary fence. Now the notch can be used to locate the path of the blade in the workpiece (*Dado 1*).

Another method is to use the rip fence as a stop. To do this, lock down the fence so the layout lines align with the blade (*Dado 2*).



RABBET: Cutting a rabbet (or rabbets to produce a tongue) on the edge of a board requires using the rip fence (see drawing). To prevent damaging my rip fence, I usually clamp an auxiliary fence, made from a piece of scrap, to “bury” part of the blade. The amount of blade that sticks out determines the width of the rabbet.

BOX JOINT: To produce a box joint, the workpiece is stood on end and passed over a dado blade (see drawing). (Note: Never cut with a workpiece standing on end unless it's supported with a box joint jig or a tall miter gauge fence.)

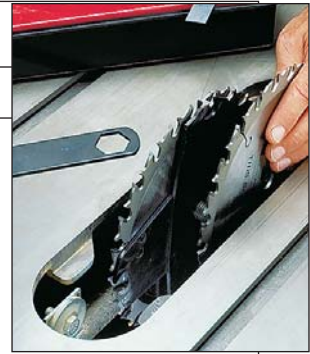


TENON: One way to cut tenons for mortise and tenon joints is with a dado blade, using the rip fence as a stop (*Tenon: Cheek*). A long tenon requires a couple passes, moving the workpiece laterally between each.

After cutting the tenon faces (cheeks), the workpiece can be turned on edge and the two remaining shoulders cut (*Tenon: Edge*).

DADO BLADE TROUBLESHOOTING

Problem	Solutions
Chipout on the face of the workpiece when cutting across the grain	<ol style="list-style-type: none"> 1. Be sure blade is sharp. 2. Make a light ($1/32$" deep) scoring pass first, then raise blade for full cut. 3. Check that trimmers are facing the correct direction. 4. Use zero-clearance insert. 5. Place masking tape over layout lines before cutting. 6. Use a stack set, not a wobble blade.
Chipout on the edge of the workpiece	<ol style="list-style-type: none"> 1. Back up cut with an auxiliary fence attached to the miter gauge.
Depth of dado/groove is inconsistent from one end of cut to the other	<ol style="list-style-type: none"> 1. Hold workpiece down tight on top of dado blade with push stick when cutting. 2. Use a featherboard on top of workpiece. 3. Be sure workpiece is flat, not warped. 4. Support long boards with infeed and outfeed tables.
Dado doesn't have a flat bottom	<ol style="list-style-type: none"> 1. Use a stack set, not a wobble blade. 2. Sharpen all blades of a stack set at the same time to maintain consistent size.
Dado is wider than all blades of a stack set put together should yield	<ol style="list-style-type: none"> 1. Be sure teeth of one blade don't touch teeth of blade next to it. 2. If using thin shims, check if they have fallen between the threads on the saw arbor (or use magnetic shims).
Dado is slightly narrower than needed	<ol style="list-style-type: none"> 1. If using stack set, add shims (see page 2). 2. If using wobble blade, readjust.
Dado blade grabs workpiece and pulls it (especially when using a radial arm saw)	<ol style="list-style-type: none"> 1. If using radial arm saw, push saw through workpiece, don't pull it. 2. Switch to a dado blade with a negative tooth angle. 3. Switch to a special "safety" blade with anti-kickback ridges behind each tooth.
Burning occurs when cutting dados	<ol style="list-style-type: none"> 1. Be sure blade is clean and sharp. 2. Check that rip fence is parallel to the saw blade. 3. Cut is too deep. Make repeat passes raising blade between passes. 4. Feed rate is too slow.



A TALE OF TWO BLADES



While I was testing stack dado blades, I came across a couple of sets that were a little unusual. The first one (*left*) only cost \$54.99.

How can they even make a seven-piece carbide-tipped set (with shims) at this price? The answer is with fairly thin carbide tips and lower quality brazing.

Okay, but how does it cut? Actually, I was surprised how cleanly it cut in hard maple — as long as I didn't feed the work too quickly. It chipped out some across

the grain of plywood. But with a slow feed rate, it was acceptable. Order it (No. 141037) from Woodcraft Supply at (800) 225-1153 or at www.Woodcraft.com.

I've been using the \$179 Jesada 8" stack set (*right*) for some time now and it cuts very cleanly and leaves a dado or groove with a perfectly flat bottom.

One of the things I really like about this set is that it comes with six chippers instead of five. The extra $3/32$ " chipper allows you to cut dados without shims in increments of $1/32$ " (as opposed to the more common $1/16$ " incre-

ments with most stack sets). This is great for cutting dados to accept hardwood plywood that's often a little undersized.

The Jesada 108-240 Joint-Master is available from www.Amazon.com or directly from Jesada Tools at (800) 531-5559 or www.Jesada.com.

