For centuries, woodworking was more qualitative than quantitative. Woodworkers learned to fit tenons so that they’d slide into their respective mortises with a light tap, set hand planes so that shavings were thin enough to read through, and chisel, saw, or plane to a penciled or scribed line. Rather than talking about fit in terms of “thousandths of an inch,” they relied on words like “shy,” “fat,” and “flush.”

The problem is that these words mean different things to different people and can lead to uneven results. In today’s digital age, woodworkers want to know the numbers. Dial and digital calipers can help all levels of woodworkers better understand materials, machines, and even hand tools. Where we once assumed (or guessed), we can now know—down to the third decimal point.

Knowing that wood moves, some folks may scoff at such obsessiveness, but as a former machinist, I’ve used calipers for woodworking for decades. The trick is knowing when the decimal points count and when they don’t. Here’s how to select and use calipers, including examples and advice for checking stock, inspecting blades and bits, and setting up your tools and machinery.
Dial or digital?
As you can see from the photos, left, dial and digital calipers are almost identical, except for the display. While they can be used interchangeably, each has certain advantages. Considering the reasonable price, I think your best bet is to own both.

Dial calipers are more durable. Besides surviving accidental falls better than digital versions, they don't need batteries, which means that they're always ready to work. For those two reasons, I keep a set of dial calipers in my apron pocket and use them for most measuring chores.

The downside to dial calipers is that the face is tougher to read to the third decimal point. And unless you're a math whiz, converting a decimal to its fractional equivalent (0.8125" = $\frac{13}{16}$") can make it difficult to prepare stock. Luckily, some dial faces now sport fractional scales (commonly read in $\frac{1}{64}$" increments) in addition to hundredths of an inch.

With an LCD display, digital calipers are easier to read than dial types, but they do not tolerate abuse. A fall from the bench can kill the electronics or crack the display. And even when you're careful, the batteries fail—often when they're needed most. I reserve them for my critical machine setups and for taking the most exacting measurements.

Most calipers open to 6", but since much of your measuring will be of items under 1" thick, you can get by with a smaller set. A 4" version costs less and fits the front pocket of your shop apron.
Checking Stock

Thicknessing stock
Because running a stack of boards through a planer is hard work, I prefer using dial calipers because they’re more durable and can survive accidental falls better than digital calipers. A dial face may not be as convenient for discerning thousandths of an inch, but thickness planing often doesn’t require hairbreadth precision.

The dial face offers an easy, at-a-glance way to gauge when I’m within $\frac{1}{32}$”. If I can make a pass on figured material for a tabletop without tear-out, I may stop even if I’m a few thou thicker than my intended thickness. In most instances, boards will require additional cleanup, such as hand-planing or sanding, and are likely to move in response to changes in humidity.

Checking sheet goods
Because of the typical inconsistencies in hardwood plywood, I always use calipers to check its actual thickness against its nominal thickness. The key word here is “nominal” because, for instance, the actual thickness of $\frac{3}{4}”$ plywood can vary from $\frac{45}{64}”$ to $\frac{3}{4}”$. In addition, sheets of the same nominal thickness can differ, even when purchased from the same supplier. In some cases, the thickness may vary across an individual sheet. If you're buying sheet goods from a home center, I recommend bringing your calipers and taking a few thickness measurements around the edge.

(Note: MDF is typically manufactured to an accurate nominal thickness that’s consistent across the sheet, but I have run into cases where it is thinner.)

Checking veneers and shim stock
When working with different packs of veneer for marquetry, it’s best to use pieces that are as close in thickness as possible. Choosing material that is the same thickness will save you time in the end by eliminating extra scraping and sanding to achieve a flat surface. For such exacting applications, digital calipers are your best choice.

Digital calipers are equally indispensable when selecting metal shim stock for rebuilding, repairing, and tuning up machinery.
Checking router bits
“Undersize” bits for hardwood plywood are quite popular, but there’s a chance they won’t match the plywood you’re working with. It’s a simple matter to check the bit diameter to be sure. Using digital calipers, measure across the extreme edges of the cutting arc, as shown.

If you’ve lost your original packaging or have sent any of your bits out for resharpening, digital calipers will tell you the exact diameter of the bit so you’ll know if it’s usable for the task at hand.

Setting stack dado spacers
With digital calipers, setting up a stack dado set is a simple two-step sequence. First, arrange the cutters and spacers and make a test cut. Next, zero out digital calipers in the dado, and then take a thickness measurement of the mating piece. The number on the digital display is the exact amount the dado is undersized. Insert the appropriate shim(s), and your dadoes will be dead on.

(Note: If the dado is oversized, you will get a negative reading when you measure the mating piece. In this case, simply remove a chipper or shim.)

Caliper Common Sense
You don’t need a degree in mechanical engineering to use calipers, but there are some basic techniques you should know that will produce the most accurate results:
- Zero-in the jaws before taking a measurement. To do this, close the external jaws and then adjust the face (on dial calipers), or press the reset button (on digital versions).
- Make sure the jaws are clean and free of debris.
- Keep the beam square to the work and the jaws parallel to it. Cocking the caliper in use can lead to an erroneously large measurement.
- Clamp lightly. Too much pressure can result in an errant reading. (If you close the jaws and get a negative number, you’re squeezing too hard.)
Checking groove widths and tenons
For setting adjustable rail and stile bits, I use digital calipers to obtain a precise fit to suit the panel stock. Aim for a groove that is no more than .002" wider than the panel thickness to allow the panel to float in the frame without rattling.

When setting up the corresponding rail bit, the stub tenons need to be a snug fit in their mating grooves. Using digital calipers, shim the bit for a perfect fit. (Technically called an “interference fit,” this wouldn’t work in metal but since wood compresses slightly, the joint should go together just fine.)

I use dial calipers for regular mortise-and-tenon joints. Because traditional tenons provide a larger gluing surface than stub tenons, the joint needn’t be so perfect. Even with .002”-.003” of clearance, the joint should feel snug, and will be strong once it’s glued up.

Measuring rabbets
I used to use a steel rule to measure rabbets and dadoes, but nowadays I find myself using calipers so I don’t have to squint to get an accurate reading. I use the step measuring faces for a positive purchase on the edge of the workpiece, arriving at a precise dimension in a second. I find that dial calipers usually provide more than enough accuracy for general cabinetwork, and I end up with better fitting joinery minus the frustration caused by misreading a ruler.

Measuring depths
The depth bar provides accurate depth measurements in tight spots such as small holes and mortises. Since I usually have my dial calipers in my apron pocket, I tend to use them more often than other measuring devices for this chore.

(Note: Due to the frailty of the depth bar, it’s easily bent, so be careful. Also, the small footprint of the beam end invites tilting the caliper, which produces a faulty reading. Make sure to hold the caliper perpendicular to your work.)
**Turning tenons**

Normally, good old-fashioned spread-leg outside calipers are fine for most lathe work. But when extremely accurate tenons are required on turned work, I check my progress with dial calipers. Outside digital calipers made specifically for turners have recently entered the marketplace, but I find that I can get close enough with my trusty set of dial calipers. *(Note: Never take a measurement with the lathe on. It’s dangerous and will eventually wear the measuring faces, introducing inaccuracy.)*

**Finding drill bits for clearance and pilot holes**

With hardware coming from around the globe, I’ve stopped relying on outdated screw charts to tell me what bits to use for clearance and pilot holes. Digital calipers help you make the right choice immediately. Use the main jaws as shown to measure bits and screws. For clearance holes, select a drill bit that’s a few thousandths of an inch larger than the shank of the screw.

**Checking Plane Shavings**

Many of us have met some hand plane addict who spends his days and nights gauging the thickness of his shavings (and then boasting about them). Bragging rights aside, measuring the thinnest possible shaving that a plane can produce provides useful information about the tool, the workability of a particular species, and a reliable means of adjusting fits of joints by a few thousandths of an inch.

As an exercise, sharpen a plane blade and set to work on a straight-grained wood, such as poplar or soft maple. A well-tuned plane should be able to make .001"- to .002"-thick shavings without too much trouble, and top-quality planes should be able to make consistent, full-length shavings about .0005" thick. To measure a shaving with digital calipers, slide the jaws together against the shaving without applying undue pressure (which can introduce a false reading).

Once you get a sense of what different thickness shavings look like, you’ll know approximately how many passes you need to make to get even gaps when fitting doors and drawers, and how to handle many other hand plane operations such as fine-tuning joints, shooting end grain, and truing miters.
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