

Tool Test: Squares

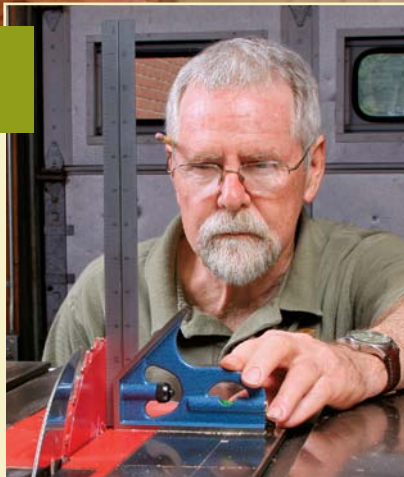
Why you need two
and which two to buy

BY PHILIP C. LOWE



12-in. square is a workhorse

It's a good size for measuring and layout, and the blade length exaggerates any errors in squareness, which helps when adjusting machinery or checking workpieces. Plus, the removable rule makes a great tool for use on flat surfaces.



Set a sawblade. Use the longer head of the 12-in. combo square to clear the table saw's throat plate when setting the blade square.



Check joinery. The wider blade of a 12-in. combo square helps when checking that tenon cheeks are parallel to a board's face.



Mark centers. Use the angled end of a combo square head to mark center points on wood-turning blanks.

A good square is an essential tool in my shop, whether it's used to set up machinery, lay out joinery, or check for squareness. I reach for one so often that I always keep two nearby—a 12-in. combination square that hangs near my bench, and a small double square that fits in my pocket.

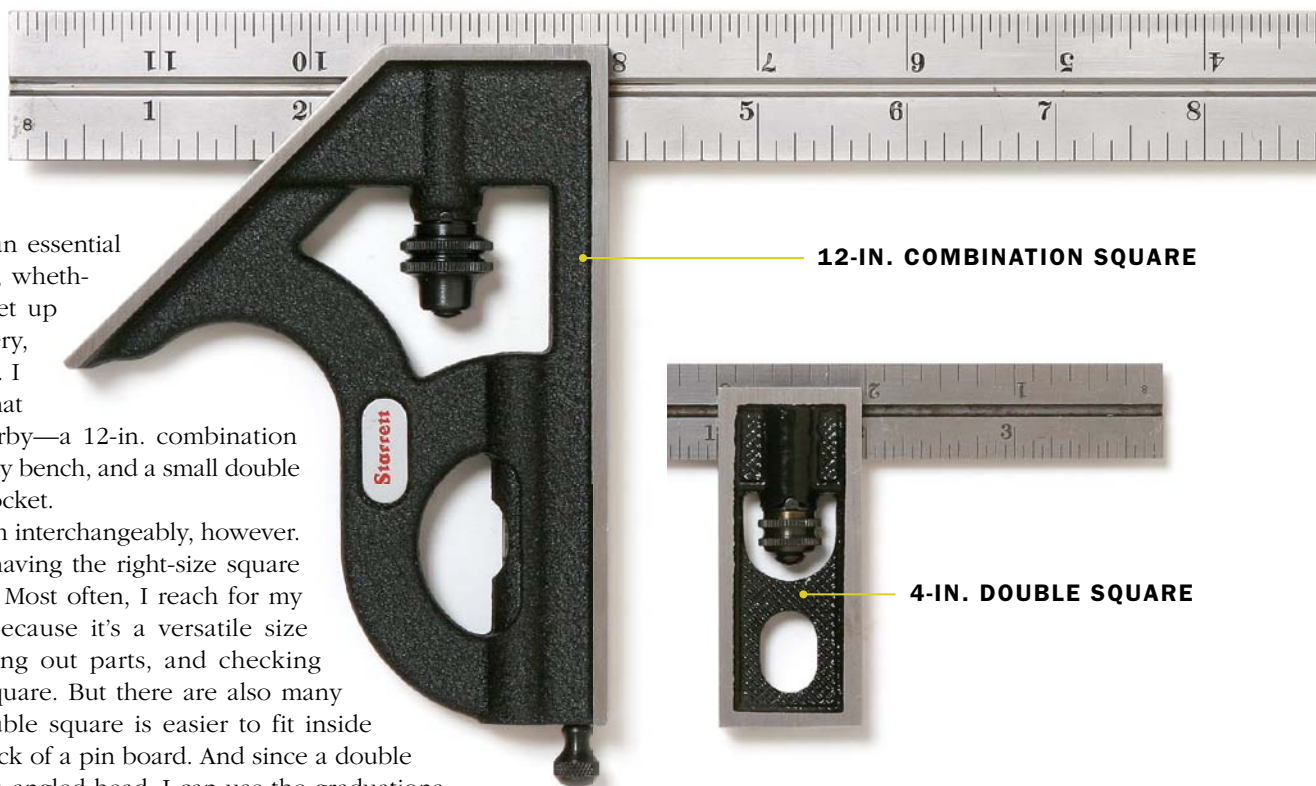
I don't always use them interchangeably, however. There are times when having the right-size square makes a big difference. Most often, I reach for my 12-in. combo square because it's a versatile size for measuring and laying out parts, and checking if surfaces are flat or square. But there are also many times when a 4-in. double square is easier to fit inside small spaces, like the back of a pin board. And since a double square does not have an angled head, I can use the graduations that run in both directions without removing and reattaching the blade. Having both types of squares will make your woodworking quicker, easier, and more enjoyable. But figuring out which brands to buy is trickier.

What to look for

I've had my two favorite squares for many years, but if I were in the market for one today, the choices would overwhelm me. When *Fine Woodworking* asked me to do a head-to-head test of both types of squares, I found at least 50 combination squares and 11 double squares on the market. So I narrowed my choices to those that would be best for woodworkers in the United States. I opted

for squares with “4R” graduations ($\frac{1}{8}$ in., $\frac{1}{16}$ in., $\frac{1}{32}$ in., and $\frac{1}{64}$ in.) because we use those fractions almost exclusively. I also stuck with models that had etched rules, which are easier to read than stamped-steel rules. I didn't look at models that come with more than just a rule and a head, because centering and protractor heads aren't that useful for most woodworkers, and buying them can increase the cost. And where both hardened steel and cast-iron heads were available, I opted for iron, which is strong enough for woodworking, and less expensive. For the doubles, I tested all 11 models.

I then gave all the squares a couple of simple tests. I used knife-line tests to verify whether each model was set perfectly

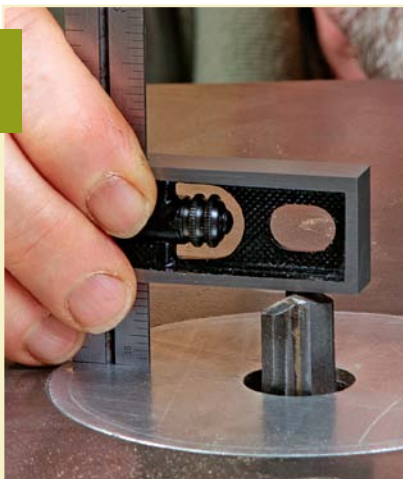


12-IN. COMBINATION SQUARE

4-IN. DOUBLE SQUARE

4-in. size is handy

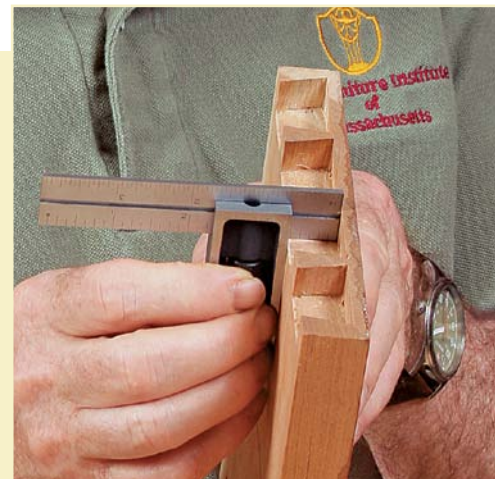
A 4-in. double square is more comfortable to use. It's big enough to handle most of the tasks its bigger cousin can, and is even more useful when checking for squareness inside cramped areas—like joinery and small boxes. And it fits in a pocket.



Set heights. Place the blade of the square on end to set router-bit heights.



Find depths. Check the depth of a mortise by extending the rule all the way to the bottom.



Work in small spaces. Use the rule to check inside half-blind dovetails.

A SQUARE MUST BE SQUARE



Accuracy matters most. On a straight board, Lowe scored a line along the edge of the rule, rotated the square, scored another line, and checked that this line was parallel to the first. Then he flipped and reattached the blade to check again. All the squares listed on p. 47 were, in fact, square.



Consistent width? Lowe used a dial caliper to measure a few spots along the rule to confirm that the width was even, and the edges parallel.

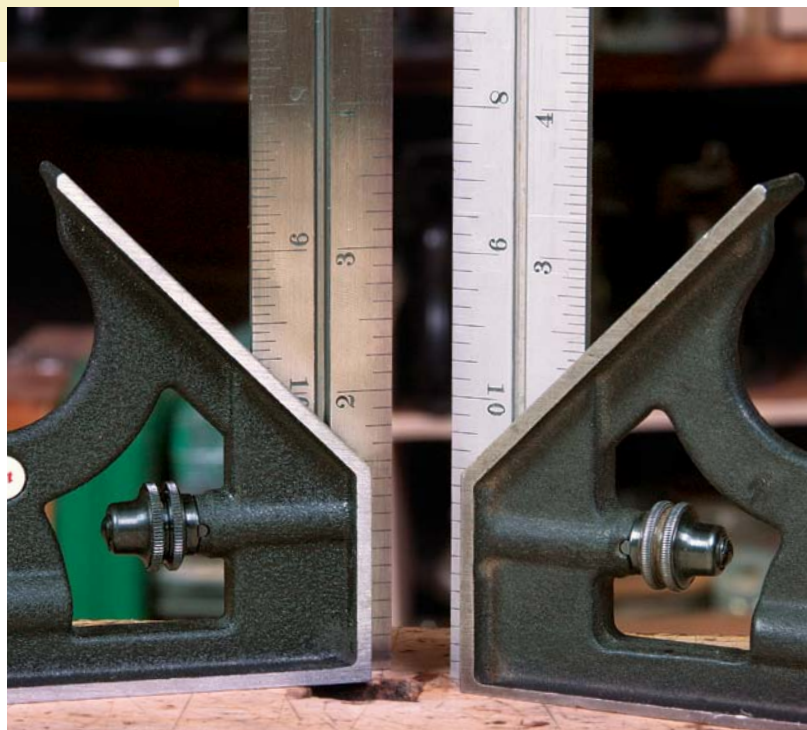
square at the factory. I then removed and reattached the blades to evaluate each square's locking mechanism, known as a lockbolt. I finished by using a dial caliper to check the width of the rules in a few spots to test whether the edges are parallel, which affects squareness. That gave me some hard data.

Next, my students at the Furniture Institute of Massachusetts helped me put each square through a day of regular use in the shop—which includes layout, machine work, and handwork. We graded each square for fit, feel, finish, and the intangibles of how it performed in a shop setting. Together, we eliminated models that didn't stand up during our routines.

Best bets

The L.S. Starrett 12-in. model with a satin chrome blade (\$100) was the clear Best Overall pick. The difference-maker between the Starrett and every other combo square is the unique lockbolt, which uses metal tabs to keep it perfectly positioned to enter the slot in the rule. The design makes removing and inserting the blade quick and easy. It may sound trivial, but the blade must be reversed for some measurements and I also use it on

READABILITY RULES



The finish is important. Compared with satin chrome (right), the high polish of a hardened steel rule (left) is harder to read beneath the glow of shop lights.

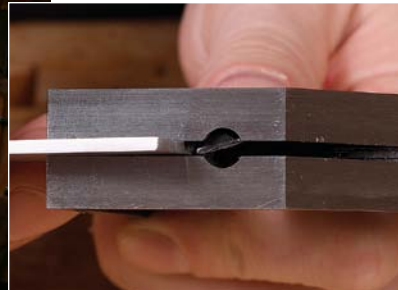


Avoid confusing markings. The graduations on the Swiss Precision Instruments rule (left) are numbered by eighths and are almost of equal length, which can be confusing compared to traditional graduations (right).

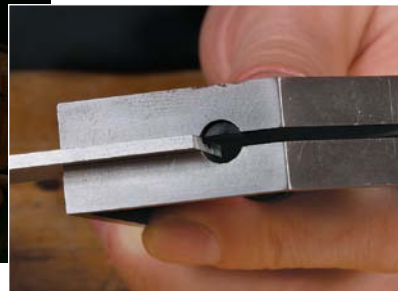
WHERE PARTS MEET

LOCKBOLTS

Some are finicky. Combo-square blades are removed and flipped frequently, and some lockbolt designs are more troublesome than others.



The trouble with alignment. It's difficult to keep lockbolts aligned when attaching the rules on most squares (top). But the tabbed lockbolt on the Starrett (bottom) stays aligned for smooth changeovers.

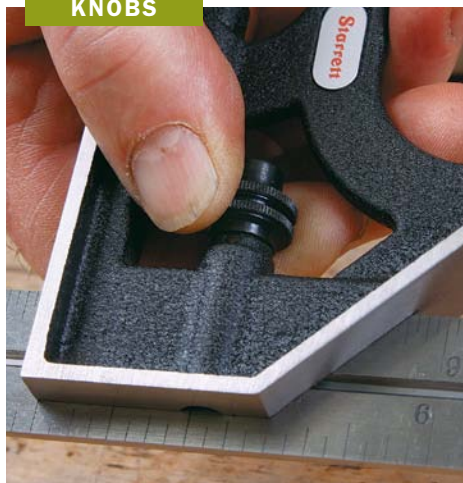


its own sometimes. Having to toy with the finicky lockbolts found on other squares is an annoyance. The fit, finish, and machining on this Starrett model were just as excellent. I also tested a Starrett with a shinier, hardened-steel rule (\$77), but my students and I found that the glare on the blade made the markings harder to read. Its superior lockbolt would still make that model a solid choice, but not the best.

You can find decent 12-in. squares from other makers, too. Among those I tested, the combination square from Products Engineering Corp. (PEC Tools) stood out. It performed well, had a lockbolt that was relatively easy to use, and came with a satin chrome blade. At \$44, it cost half as much as the Starrett, and was my pick for Best Value.

For double squares, the Starrett (\$53) was Best Overall again. Once more, the well-designed lockbolt makes it a stand-out, but the blade is equally important. At $\frac{5}{8}$ in. wide, the Starrett blade is narrower than the others. That makes it slightly better for fitting into tight spaces, an important consideration for small squares. It was the only double square I tested that didn't have a satin chrome blade. And the hard-

KNOBS



Get a grip. The two rows of knurling on the Starrett knob (left) were easy to grip, but the shallow knurling on the Mitutoyo (right) was tougher to get a handle on.

ened steel did make it a little tougher to see at some angles, but not enough to be truly troublesome.

As with the combo squares, The PEC Tools double square is my pick for Best Value. It has an easy-to-read satin chrome blade, it performed well and stayed square, and it costs much less (\$23) than a Starrett. Interestingly, the double squares branded by several other companies—Mitutoyo, Brown & Sharpe, Lee Valley, Pin-

nacle, and McMaster-Carr—appear to be identical to the PEC, with slight cosmetic differences, such as the color of enamel on the head (see “Will the real Best Value please stand?” p. 46). So if you can find one of those at a lesser price than the PEC, it's a good buy. □

Philip C. Lowe is founder of the Furniture Institute of Massachusetts and a frequent contributor to Fine Woodworking.

HEAD TO HEAD

Since all the squares are accurate, ergonomic details make the difference.

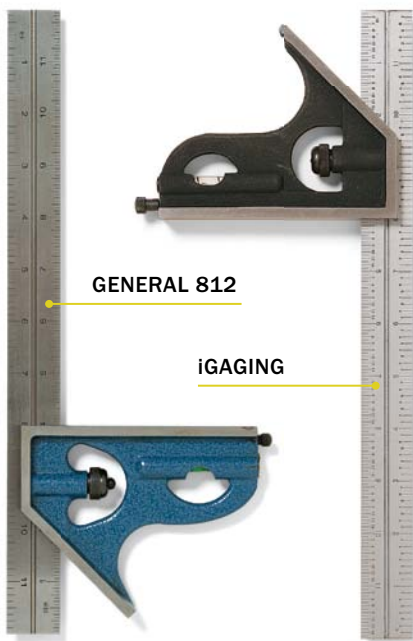
12-IN. COMBO SQUARES



STARRETT
Satin chrome

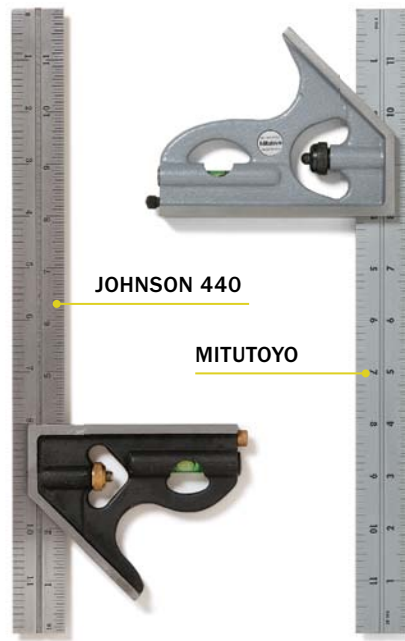


PEC



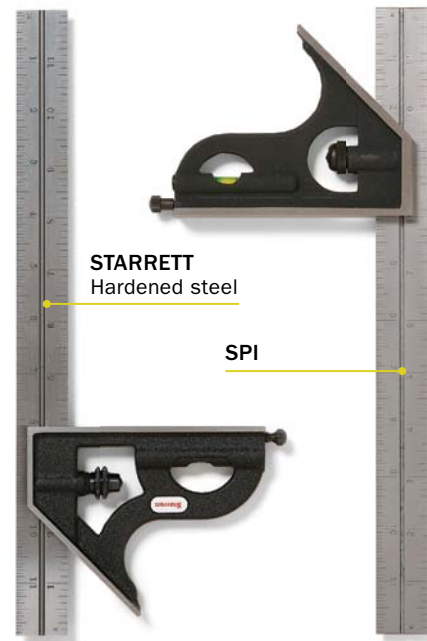
GENERAL 812

IGAGING



JOHNSON 440

MITUTOYO



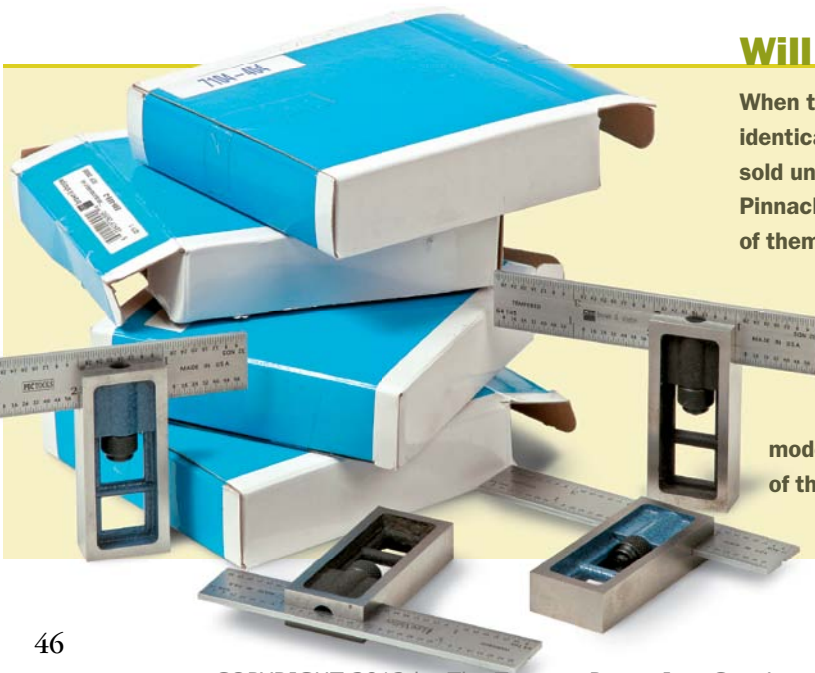
STARRETT
Hardened steel

SPI

Will the real Best Value please stand?

When testing squares for this review, we found many to be nearly identical, though prices varied. For instance, double square models sold under the brand names PEC, Lee Valley, Brown & Sharpe, Pinnacle, and Mitutoyo all appear to have been made by PEC. Four of them even came in the same blue-and-white box. Aside from a few cosmetic differences, they performed identically, but the prices ranged widely, from \$23 for the PEC to about \$55 for the Brown & Sharpe.

Rather than list these identical models in the chart, we chose the lowest-price model available at press time. That model, the PEC, was picked as Best Value. However, if you find any of these others for a lesser price, go for it.



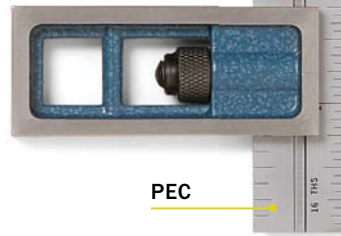
4-IN. DOUBLE SQUARES

**AUTHOR'S
BEST OVERALL
CHOICE**



STARRETT

**AUTHOR'S
BEST VALUE
CHOICE**



PEC

iGAGING



SPI



THE FIELD AT A GLANCE

MODEL/SOURCE	STREET PRICE	BLADE	EASE OF REPLACING RULER	EASE OF READING RULER	MACHINING AND FINISH	COMMENTS
12-IN. COMBINATION SQUARES						
General 812 amazon.com	\$35	Stainless steel	Good	Good	Good	Good overall product; comfortable to use all around; looks like a PEC but without the satin-chrome-finish rule.
iGaging rockler.com	\$30	Satin chrome	Fair	Excellent	Good	Performed well; accurate and legible; loose lockbolt made for difficult re-assembly; nearly identical to models from Westward and Highland Woodworking.
Johnson 440 amazon.com	\$29	Hardened steel	Fair	Good	Good	Locknut a bit small in relation to the head; graduations are not clear, and only go down to 1/32 in.; lockbolt loose in hole; some sharp edges.
Mitutoyo grainger.com	\$123	Satin chrome	Good	Excellent	Good	Excellent tool, but the knurling could be a little coarser; head and blade sold separately.
Products Engineering Corp. (PEC) amazon.com	\$44	Satin chrome	Good	Excellent	Good	Very good product; nearly identical to models from McMaster-Carr and Brown & Sharpe.
Starrett woodcraft.com	\$100	Satin chrome	Excellent	Excellent	Excellent	Superior lockbolt design made head easy to remove, replace, and lock down; well machined, easy to read, and an excellent all-around performer.
Starrett leevalley.com	\$77	Hardened steel	Excellent	Good	Excellent	Performed as well as the Starrett satin chrome model with the same basic design; however, the hardened steel rule was harder to read under lights.
Swiss Precision Instruments (SPI) mscdirect.com	\$63	Satin chrome	Fair	Poor	Good	Good tool but the graduations were difficult to read because lines are nearly identical lengths.
4-IN. DOUBLE SQUARES						
iGaging grizzly.com	\$10	Satin chrome	Fair	Excellent	Fair	Poor locknut action makes it difficult to replace the rule; nearly identical to models from Highland and Rockler.
PEC wttool.com	\$23	Satin chrome	Good	Excellent	Good	Good fit and feel and comfortable to use; locknut occasionally needed extra tightening to keep blade in place; least expensive of the PEC-made models.
Starrett leevalley.com	\$53	Hardened steel	Excellent	Good	Excellent	Head is easy to remove, replace, and lock down; narrowest blade, at 5/8 in., made it easier to fit into tight places; hard to read under bright lights.
SPI mscdirect.com	\$37	Satin chrome	Fair	Poor	Fair	Difficult to distinguish lines on ruler.