

Waterstones

They're the best choice
for honing sharp edges

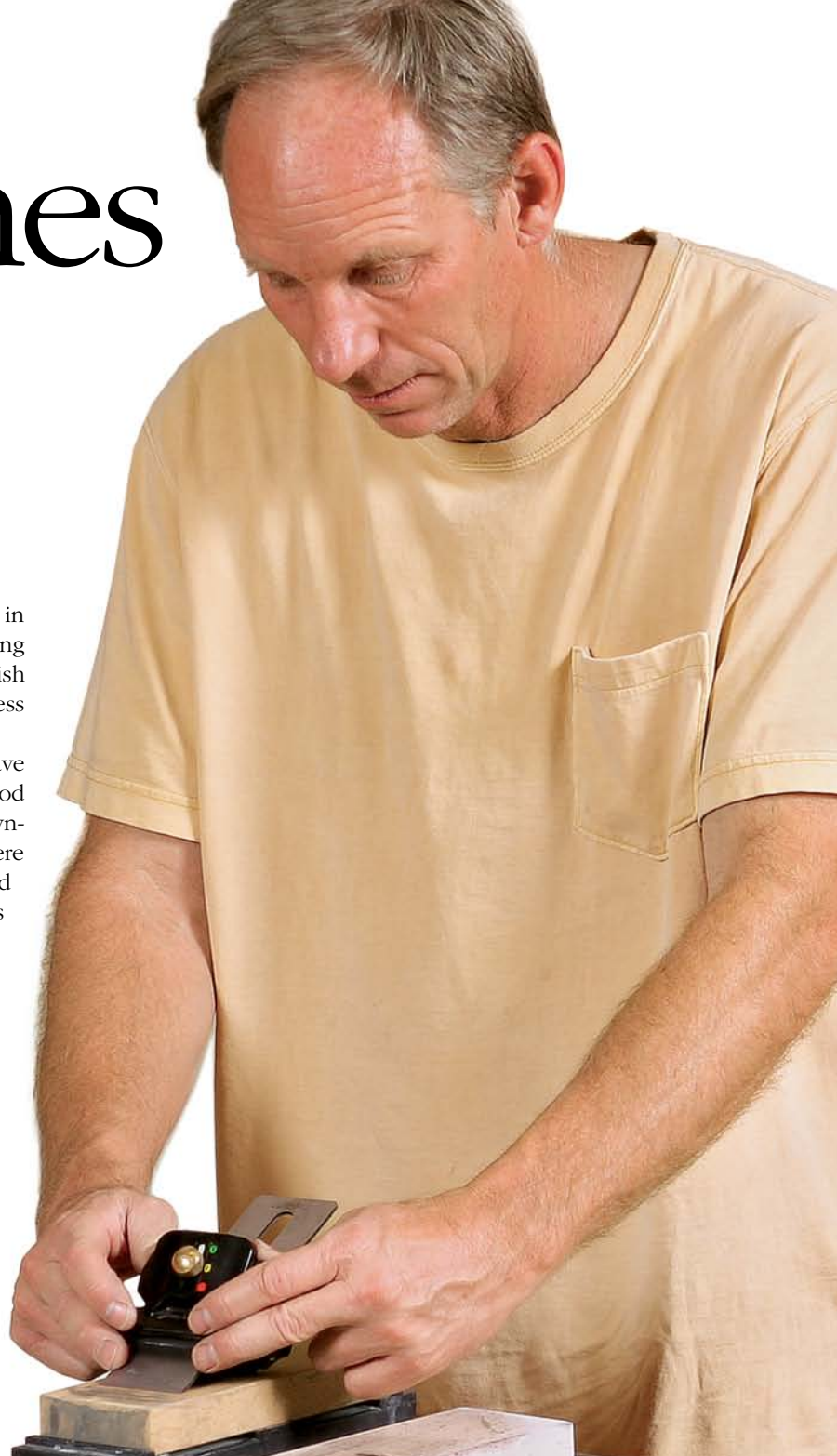
BY CHRIS GOCHNOUR

After many years of experimentation, there's no doubt in my mind that waterstones are the best choice for honing chisels and handplane blades. They produce a finer polish than both oil and diamond stones, and are more durable and less expensive (in the long run) than sandpaper.

Natural waterstones have been quarried for centuries and have always been highly prized, but the supply has diminished. Good ones are difficult to find and can be very expensive. However, synthetic waterstones are widely available and more affordable. There are so many for sale at woodworking stores, in catalogs, and online, that it's not easy to know which one to buy. In fact, that's why the editors at *Fine Woodworking* asked me to test them.

Bear in mind that waterstones are best used for honing a small, secondary bevel, not grinding the primary one. So, I looked at the three grits I use to hone: 1,000, 4,000, and 8,000. Some manufacturers don't make stones in those exact grits, so I used an equivalent grit in those cases. Also, one set had only two stones (1,200-grit and 8,000-grit) based on the recommendation of the retailer.

Synthetic waterstones have a reputation for dishing quickly, and you can't get a flat, straight cutting edge from a dished stone. So, the first thing I evaluated was how quickly they dished and how fast I could re-flatten them. I then tested how



The 4 things that matter most

You want a stone that is easy to keep flat, cuts quickly, and sharpens your tools well enough for woodworking. Our tests were designed to find the waterstones that fill that bill.

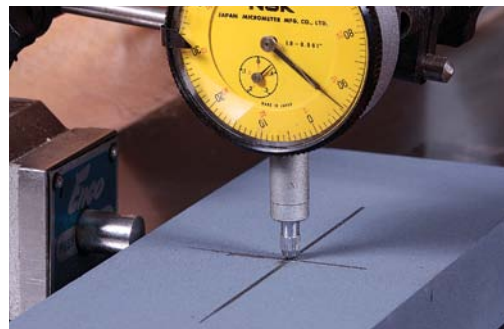
1 HOW FAST DOES IT DISH?

A dished stone won't sharpen edges consistently, so one that dishes quickly will need frequent flattening.

Gochnour started with a flat stone. After setting up on a flat surface—a jointer outfeed table—he zeroed out the dial indicator, referencing off the stone's center point.



He worked the center. Gochnour took 300 strokes with a plane blade in a honing guide. He added a 4-lb. weight to the guide so that the pressure was consistent through all of the tests.



And finished with a second reading. After re-marking the center of the stone, Gochnour took another reading with the dial indicator to determine the amount of dishing.

quickly they sharpened both O1 (standard high-carbon tool steel) and A2 (a tougher alloy) blades. Finally, I used them to sharpen plane and chisel blades, and used those tools to take shavings from end and edge grain, as the ultimate real-world test. Results from all of the tests are in the chart on pp. 56-57.

Durability and maintenance

To see how quickly the stones dish, I based my methods on the elegantly simple ways that Lee Valley tests the waterstones they

are considering for sale. I started by flattening the stones with a diamond lapping plate. Then I measured their height with a dial indicator. Next, I took the stones over to my workbench, and dished them with a plane blade (see photos, above). After that, I measured the stones' height again, which told me how much material had been removed. All of the 1,000-grit stones dished. However, none of the 8,000-grit stones dished enough for me to measure, which means you won't need to flatten them as often.

After the stones were dished, I flattened them with the diamond lapping plate, counting the number of strokes it took to do it. Because the 8,000-grit stones showed no measurable dishing, I didn't do the flattening test on them.

2 IS IT EASY TO FLATTEN?

All waterstones do inevitably dish, so you want one that's quick to flatten.

The disappearing lines test. Gochnour drew a crosshatch pattern over the stone and then rubbed a diamond flattening plate over it until the marks were gone, counting the strokes as he went.



Honing speed

Next, I tested the stones to see how quickly they cut both A2 and O1 steel. The test for both the 1,000-grit and 8,000-grit stones was essentially the same. I put a blade in the honing guide, set to 25°, and honed it to get an even surface on the bevel. Next, I scratched the bevel, taking both back-and-forth strokes along its length and diagonal strokes, which stand out better. Then I counted the number of strokes it took to remove the scratches on each stone.

I tested the 8,000-grit stones the same way, except I scratched the blade with a 2,000-grit Shapton Glass stone. I evaluated the bevel after 100 strokes, noting the amount of scratching still present and the quality of the polish.

Performance

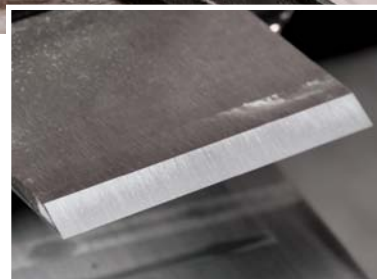
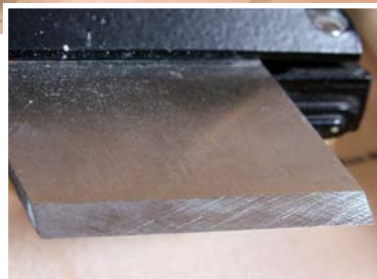
The next stage of testing looked at the performance of the edges produced by each set of stones. To sharpen each blade, I used the 1,000-grit stone until a burr formed on the back, I refined the edge with the 4,000-grit stone, and then I polished the edge and

3 HOW QUICKLY DOES IT HONE?

The less time you spend honing, the more time you spend woodworking. Gochnour tested the 1,000 and 8,000-grit stones on both O1 and A2 blades.



Scratch test. To test each stone, Gochnour first used it to polish the entire bevel, then scratched the bevel on a rougher stone. Last, he returned to the original stone to polish out those scratches.



How many strokes? Gochnour checked his progress regularly to see how long it took for the stone to get rid of the scratches. A consistent scratch pattern over the entire bevel was the telltale sign that the job was done.

removed the burr with the 8,000-grit stone. I started with an end-grain paring test, using an O1 steel paring chisel to take a shaving across the end grain of a basswood board. First, I clamped the board in a wooden clamp so that its end stuck up 0.013 in. above the clamp. I rested the chisel on the clamp's jaws and pushed it across the entire width of the board. After removing the shaving, I graded the quality of the surface left behind.

I then did an end-grain planing test, using a Veritas low-angle jack plane with an A2 blade. I clamped a 1-in.-thick by 12-in.-wide piece of cherry in my bench vise and took a full-width shaving (0.003 in. thick) across the end grain. In addition to evaluating the surface quality left afterward, I also considered how much force was needed to push the plane across the board.

For the last test, I used a Lie-Nielsen No. 5 jack plane with an A2 blade to plane a 0.001-in.-thick shaving from the edge grain of a 1¼-in.-thick by 84-in.-long cherry board. I assessed how much effort it took to push the plane, how easy it was to get a continuous shaving, and the surface quality left by the blade.

The bottom line

Every set of stones I tested is capable of producing a cutting edge good enough for the finest woodworking. And after all of the testing, I couldn't pick just one set for best overall, because three stood out: Naniwa Chosera, Shapton GlassStone, and Sigma Power. The differences among these sets is very small. The Chosera stones performed extremely well, but the 1,000-grit stone dished

4 THE ULTIMATE TEST: PERFORMANCE

Gochnour used three real-world tests to see if blades sharpened with the stones left tearout, rough grain, or any other defects.



End-grain paring is a tough job. It takes a very sharp edge to slice end-grain fibers cleanly, especially in softer woods like this basswood.



It's not easy for a handplane, either. Gochnour took a continuous shaving from the end of a wide cherry board.



Long grain, too. The goal was to get a thin edge-grain shaving the full width and length of a 6-ft.-long cherry board.

THE FINAL CUT

All of the waterstones produced an edge suitable for fine woodworking, leaving smooth surfaces with no tearout. It's also clear that it takes longer to sharpen A2 blades than it does O1 blades, but the same stones that do well on the one tend to do well on the other. When it comes to maintenance, none of the 1,000-grit stones were a burden to flatten. Even the most dished ones can be done in less than a minute. And the polishing stones—the highest grit, which matter most—dished so little that we couldn't measure it. So, you'll hardly ever need to flatten those. All that being said, Gochmour's tests discovered significant differences between stones.

slightly more. The Shapton GlassStones didn't cut as quickly, but dished the least and performed great, too. Like the coarse Shapton, the Sigma Power 1,000-grit stone dished just one thousandth of an inch. The Sigma stones cut faster, but didn't perform quite as well as the Chosera and Shapton stones. Mind you, we are talking tiny degrees here.

My choice for best value is the set from Japan Woodworker, which has two stones: a Bester 1,200-grit and the Kitayama 8,000-grit. This set is proof that two stones can do the job of three. And they are a great deal at \$153 for the two. On the downside, the coarse stone did dish the second most. If you already have a set of waterstones and want to replace only your polishing stone, or if you need to add an 8,000-grit stone to your arsenal, I recommend getting the Naniwa Chosera, Shapton, or Sigma Power. A fourth alternative is the Naniwa Superstone 8,000-grit. It performed very well as a polishing stone, and is a great value at \$70. □

Chris Gochmour is a furniture maker in Salt Lake City, Utah.

NAME	STONES TESTED	STREET PRICE	DISHING
Bester/Imanishi leevalley.com	1,000, 5,000, 8,000	\$47, \$59, \$74	0.006 in.
Bester/Kitayama japanwoodworker.com	1,200, 8,000*	\$59, \$94*	0.002 in.
King leevalley.com	1,000, 4,000, 8,000	\$27, \$29, \$63	0.002 in.
Naniwa Chosera toolsforworkingwood.com	1,000, 5,000, 10,000	\$87, \$140, \$266	0.002 in.
Naniwa Superstone toolsforworkingwood.com	1,000, 5,000, 8,000	\$36, \$60, \$70	**
Norton woodcraft.com	1,000, 4,000, 8,000	\$44, \$60, \$92	0.002 in.
Shapton craftsmanstudio.com	1,000, 4,000, 10,000	\$49, \$62, \$148	0.001 in.
Sigma Power toolsfromjapan.com	1,000, 6,000, 13,000	\$50, \$73, \$144	0.001 in.
Sigma Power Select II leevalley.com	1,000, 3,000, 10,000	\$68, \$73, \$94	0.007 in.

* Japan Woodworker recommended only a coarse and fine stone.



BESTER/IMANISHI

BESTER/KITAYAMA

KING

NANIWA CHOSERA

NANIWA SUPERSTONE

1,000-GRIT STONES			8,000-GRIT STONES					COMMENTS
FLATTENING (strokes needed)	HONING SPEED (rated 1-10)		HONING SPEED (rated 1-10)		PERFORMANCE (rated 1-10)			
	O1	A2	O1	A2	End-grain paring	End-grain planing	Edge-grain planing	
14	8	6	8	4	8	8	9	These moderately hard stones have a good feel during use.
15	10	8	9	3	7	8	8	Great results from just two stones, but remove the wooden base on the 8,000-grit stone—it warps after getting wet.
10	8	7	4	3	5	6	5	Grits are not marked on the stones. Use a Sharpie to tell them apart.
8	8	7	7	4	9	8	9	The Chosera have the smoothest cutting action of all the stones tested and create a nice slurry during use.
**	4	1	4	3	9	9	8	The 8,000-grit stone produced an excellent polish, but the stones are not well-mounted on their plastic bases.
15	9	8	7	5	6	7	6	Honed A2 steel the quickest.
9	9	6	6	4	9	8	9	These stones are very hard and blades occasionally chattered across the surface.
11	9	7	8	4	8	8	9	Excellent value at \$317 for a full set that includes a 400-grit diamond plate for flattening.
27	9	7	7	3	6	6	7	1,000-grit stone dished so quickly that it created a cambered blade, which the finer stones were not able to correct easily.

** 1,000-grit Superstone tended to bow upward during our dishing test, making it impossible to measure wear.



NORTON



SHAPTON

HIGHER GRITS AREN'T ALWAYS BETTER

Shapton also makes 16,000-grit and 30,000-grit GlassStones. To see if they would produce a better edge than the lower-grit polishing stones, I subjected them to the same performance tests. The 16,000-grit stone produced a polish comparable to the best standard polishing stones, and the 30,000-grit stone produced the highest polish of all. Yet, despite the polish, neither stone produced an edge that performed better. For woodworking, I don't think these stones are necessary. —C.G.



SIGMA POWER



SIGMA POWER SELECT II