What was tested

To test the drill bits' durability, the author drilled more than 1,000 holes with each brand in hard maple and particleboard. The bits also were tested for the accuracy of their stated dimension, the efficiency of their design, and their chip-clearing ability.

TOOL TEST

Brad-point Bits

Eight brands, 8,000 holes, surprising results

BY CHRIS A. MINICK

I learned long ago that when it comes to drilling wood, reach for a brad-point bit rather than a standard twist bit. The low-angled, blunt point of a twist bit can skate across the wood and leave a curled scar in its path, and makes it difficult to locate a hole accurately. The profile of a brad-point bit creates a much cleaner hole (except in end grain), while the brad in the center of the bit makes it easy to place the bit accurately on layout lines.

In my early woodworking days, I tried cheap bits with predictably bad results. Since then I've switched to medium-priced sets, but often wondered if budget-priced bits have improved, or if I should invest in a high-priced set. So I devised a test to find out.

How the bits were tested

I purchased eight brands of seven-bit sets ranging in price from $6 to $63. The bits increased in 1⁄16-in. increments from 1⁄8 in. to 1⁄2 in. Although I tested several sizes, I selected the 3⁄8-in. bit for the most exhaustive testing because it is the one most often used for dowel joints and screw-plug holes.

I drilled more than 1,000 holes with each brand to evaluate the bit's longevity, its chip-clearing ability, the crispness of the entry and exit holes it created, and the diameter of the hole it produced compared to the drill bit's diameter. I used both a benchtop drill press set at 1,550 rpm and a cordless drill operating at 500 rpm.

Testing for durability—To see how well the 3⁄8-in. bits fared over time, I used them straight from the package to drill two holes, 1⁄2 in. deep, into 3⁄4-in.-thick hard maple and lauan plywood. Then I drilled two holes through the same materials. At the end of the tests, I drilled a second series of holes adjacent to the first set to compare before-and-after performance.

In between, I drilled 100 holes, 1 in. deep, in hard maple; 875 holes, 1⁄2 in. deep, in particleboard; and another 100 holes, 1 in.

Checking the size. *Minick used calipers to check the size of each bit as well as the diameter of the hole that it drilled to test for runout.*

Drill bits get hot. *A temperature probe measured how hot the bits got when drilling into hard maple. Well-designed bits stayed coolest.*

Clogged bits can't cut it. *Some of the less-expensive bits were unable to clear the chips when drilling into pine.*

Photos: Mark Schofield

Test results

The ⅜-in. bits were selected for the most rigorous tests, drilling 200 holes in hard maple and 875 in particleboard. The 3⁄16-in. bits were tested for clogging in pine; the ½-in. bits were tested on white oak.

BRAND	HARBOR FREIGHT	TOOL SHOP	FISCH PRECISION
SUPPLY SOURCE	www.harborfreight.com 800-423-2567	Menards stores (not available online)	www.7corners.com 651-224-4859
COUNTRY OF ORIGIN	China	China	Germany
PRICE (7-bit set)	$6	$8	$19
BIT TYPE	Spade	Spade	Spade
BIT DIAMETER (⅜-in. bit)	0.371 in.	0.371 in.	0.371 in.
HOLE DIAMETER (last hole)	0.375 in.	0.380 in.	0.372 in.
AVERAGE TEMPERATURE (first 100 holes / last 200 holes)	254°F / 268°F	157°F / 194°F	225°F / 244°F
ENTRY HOLE RATING (maple / plywood)	Good / Good	Good / Good	Fair / Fair
THROUGH-HOLE RATING (maple / plywood)	Poor / Poor	Good / Fair	Excellent / Good
CHIP CLEARING (pine, 3⁄16-in. bit)	Poor	Poor	Excellent
HOLE DEPTH (white oak, ½-in. bit)	0.010 in.	0.052 in.	2.000 in.

Incidentally, it takes almost two hours and one cup of coffee to drill 1,083 holes.

deep, in the maple for a total of 1,083 holes with each bit. Incidentally, it takes almost two hours and one cup of coffee to drill 1,083 holes.

How hot did the bits get? Heat is generated from friction and is directly related to drill-bit design. Generally, bits that drill by scraping or have poor chip ejection will get hotter and dull faster than those that cut instead of scrape. Drilling in hard maple, I evaluated the heat buildup by checking the temperature of each bit every 20 holes with a laboratory surface-temperature probe. I averaged the results from before and after I drilled the particleboard to see whether this material had dulled the bits and increased their temperature.

Testing drill-bit design—To see how the bits performed when underpowered, I used my cordless drill to test for chip clearing and maximum hole depth. I used each 3⁄16-in. bit to make a 1-in.-deep hole in pine. Clogged flutes will bog down an underpowered drill. I rated the bit excellent if no clogging was evident and poor if the flutes clogged before the bit reached the full depth.

I also drilled a hole in 2-in.-thick, rock-hard white oak with the ½-in. bit from each set. I recorded the depth of the hole where the drill quit cutting.

The design of the drill tips affected the results

The profile of the tips fell into one of three categories: spade-shaped, W-shaped, or spur-shaped (see photos and chart, above).

Spade-shaped bits performed worst—The least-expensive sets in this test, Harbor Freight, Tool Shop, and Fisch Precision, drill by a combination of cutting and scraping, generating more fine dust than the other shapes. The resulting holes were also more ragged. In the chip-clearing test, Harbor Freight and Tool




FISCH "VORTEX D"	WOLFCRAFT	CARBIDE TIPPED	LEE VALLEY HSS	FOREST CITY
www.toolcenter.com 888-778-9663	www.hardwarestore.com 800-282-4393	www.highland hardware.com 800-241-6748	www.leevalley.com 800-871-8158	www.highland hardware.com 800-241-6748
Germany	China	China	USA	USA
$63	$19	$25	$38	$58
W	W	Spur	Spur	Spur
0.375 in.	0.373 in.	0.375 in.	0.375 in.	0.376 in.
0.377 in.	0.375 in.	0.377 in.	0.376 in.	0.376 in.
146°F / 175°F	252°F / 281°F	154°F / 207°F	185°F / 192°F	178°F / 204°F
Good / Poor	Fair / Poor	Excellent / Excellent	Excellent / Excellent	Excellent / Excellent
Excellent / Good	Good / Fair	Good / Fair	Excellent / Good	Good / Fair
Excellent	Excellent	Excellent	Excellent	Excellent
1.266 in.	0.669 in.	1.856 in.	1.415 in.	1.068 in.

Shop were the only brands that clogged to the point where they stopped cutting. The ½-in. bit from each set barely made a dent in the white oak. The center point on the Harbor Freight ⅜-in. bit was so far off center that my test board shook violently when the bit engaged the wood.

The Fisch Precision bit was only slightly better; it was the only bit that could bore through the entire 2-in. thickness of white oak and the only spade-shaped bit to produce a clean exit hole in the through-boring test. However, the entry hole it produced was very ragged and trumped any advantages this set may have had.

As a group, this bit shape required more effort to drill a hole, so much so that my elbow hurt after 1,083 holes with the Tool Shop bit. The adage "You get what you pay for" rings true again.

W-shaped bits had mixed abilities—If chip-free exit holes, even in splintery plywood, are important to you, then the Fisch Vortex D is the set to buy. However, the Wolfcraft bit bored a hole almost as clean for about one-third the price. The entrance holes for both bits were slightly ragged, though. Chip clearing was excellent for both, but the Wolfcraft bit penetrated only about ⅝ in. into the white oak before the drill bogged down. The oak case for the Fisch set of bits is a nice touch but hardly justifies the high price, especially since the performance of these bits in the entry-hole test was worse than that of the less costly sets.

Spur-shaped bits were best overall—The carbide-tipped bits from Highland Hardware, Lee Valley's high-speed steel (HSS) set, and the Forest City brand all cut clean, accurate holes in maple and plywood. Chip clearing was not a problem and all drilled to a respectable depth in the white oak, leaving flat-bottomed holes similar to the Forstner bits that they resemble. The Lee Valley bits penetrated easily and produced a nearly chip-free exit in hard maple.

Highland Hardware's carbide-tipped bits have a slightly different design than the others. While the tip of the ⅜-in. bit measured 0.375 in., the shank was reduced to 0.350 in. This design gives excellent chip removal but is unsuitable for a doweling jig.

My curiosity is quenched. The Lee Valley HSS bits impressed me the most, with their clean cutting action and flawless holes. I now own a set of bits that cost less than $40 and should last a lifetime. If anybody has a use for lots of perforated boards, let me know. □

Chris A. Minick is a consulting editor.