



TOOL
TEST

Hammer Drills and Impact Drivers

The tools in these brushless combo kits work hard and run for a long time between charges

BY JEREMY HESS

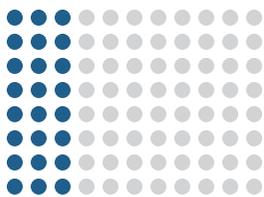
BOSCH has more than 50 tools in its 18v Li-ion system and offers batteries rated up to 6 Ah. Three lights surrounding the chuck on the impact driver provide ample light no matter what the position of the workpiece. An unusual chuck accepts both 1/2-in. mechanics sockets and 1/4-in. hex-shaped driver bits. I found two drawbacks to this design: First, the tool is larger than the others; second, some bit holders don't fully lock into place. However, it was convenient not to need socket adapters when installing lags or tightening foundation bolts. Installing a driver bit takes two hands—one to pull out on the collar and one to insert the bit. Although it's not a major issue, I find two-handed bit changes a little annoying. The light on the hammer drill is located above the battery and works well. Unfortunately, the hammer drill was the slowest in the concrete-block test.

**Bosch
CLPK250-181L**

PRICE \$377
BATTERIES 2 Ah
WARRANTY
3 years (tools)
2 years (batteries)

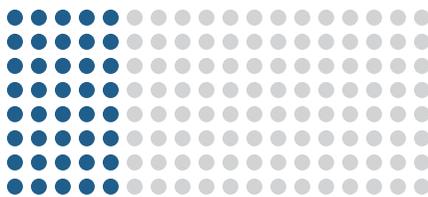


24 Concrete holes drilled



Holes per Ah: 12
Time per hole: 47 seconds

40 Structural screws driven



Screws per Ah: 20
Time per screw: 9.5 seconds

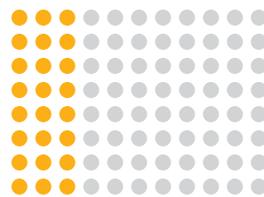
DEWALT has more than 75 tools in its 20v Li-ion system and offers batteries rated up to 5 Ah. Three LEDs on the impact driver offer ample light around the driver bit, and the chuck allows you to push bits in without lifting the collar, making bit changes a one-handed operation. Along with the Rockwell, the DeWalt is the only impact driver that doesn't have adjustments for maximum speed and torque. This isn't an issue for deck builders or framers, but it's something to consider for electricians or finish carpenters. The hammer drill is well balanced, is easy to use in any position, and has minimal vibration, making it comfortable during extended drilling of concrete. The single LED light located above the battery does a good job of illuminating the drill bit. One worry: The kit I received arrived with two faulty batteries, although DeWalt quickly sent me replacements.

**DeWalt
DCK286D2**

PRICE \$300
BATTERIES 2 Ah
WARRANTY
3 years (tools and batteries)

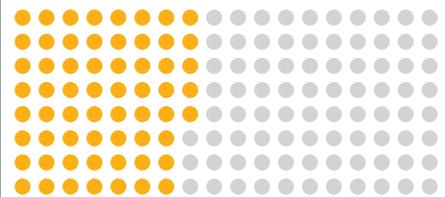


24 Concrete holes drilled



Holes per Ah: 12
Time per hole: 24 seconds

61 Structural screws driven



Screws per Ah: 31
Time per screw: 7.75 seconds

Cordless drills and impact drivers are as common on the job site as tape measures and hammers. Manufacturers are continually improving their tools and batteries in an attempt to build the cordless package that weighs the least, runs the longest, and stands up best to the rigors of job-site use. The latest improvement in this progression is brushless motors. I recently took a look at six brushless hammer-drill and impact-driver combo kits to evaluate their features and their performance in real-world tasks.

All of the kits come with two batteries and a charger and can be purchased as the base for

a cordless-tool arsenal. Rockwell offers only two other compatible tools: an oscillating saw and an impact wrench. The other kits offer a larger selection of additional tools, ranging from circular saws and reciprocating saws to specialty metalworking tools and nailers. Manufacturers try to entice purchasers with low prices on these two-tool kits, hoping they'll buy additional tools and batteries later. This hope is justified, since most users want to stick with one battery platform.

Brushed vs. brushless motors

Whether corded or cordless, the typical tool motor is constructed of an armature, a com-

mutator, and brushes. This type of motor is inexpensive to build and free of complex electronics. There are downsides, however. For example, the carbon brushes that ride against the commutator slowly wear away until they need replacement. Even worse, the drag created takes away from the useful power of the motor.

Instead of brushes, brushless motors have electronic circuitry that alternates the current to the motor's magnets to make the motor rotate. The absence of brushes eliminates the efficiency-robbing friction and allows for a more compact design for the motor and the tool. (For more on tools with brushed

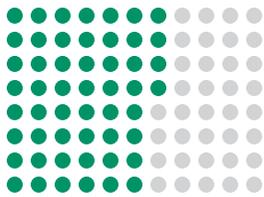
HITACHI has 30 tools in its 18v Li-ion lineup. The 3-Ah packs included in this kit are the largest-capacity batteries the company offers. A single LED light above the trigger illuminates the lower side of the bit, creating a shadow, especially when you're holding a screw to start it. The impact-driver housing is among the largest in the test, and the small trigger's shape makes it uncomfortable to use the tool for extended periods. Changing bits requires two hands. The hammer drill also has a large housing, but the tool is well balanced and comfortable to use. A single LED light above the battery illuminates the work area well. There are two features of this kit that I would change. The light is turned on and off with a button rather than the trigger, and the fuel gauge is on the tool instead of on the battery. Having the gauge on the battery is far more useful.

**Hitachi
KC18DBFL**

PRICE \$280
BATTERIES 3 Ah
WARRANTY
lifetime (tools)
2 years (batteries)

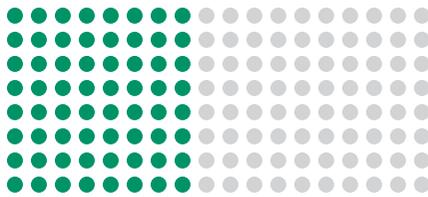


52 Concrete holes drilled



Holes per Ah: 17
Time per hole: 39 seconds

64 Structural screws driven



Screws per Ah: 21
Time per screw: 10 seconds

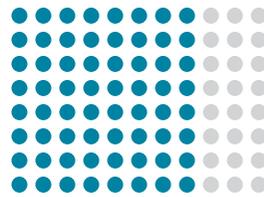
MAKITA has more than 100 tools in its 18v Li-ion lineup, and the 5-Ah packs included in this kit are the largest-capacity batteries the company offers. The impact driver was the smallest of all the drivers in the test, which is great for hanging cabinets and working in other confined areas. The driver features three speeds plus a setting for driving self-drilling sheet-metal screws like those used for steel framing and installing ductwork. In this setting, the driver spins a screw at the optimal speed for drilling and then reduces the speed once the impacting starts. The single LED light produces a shadow if you use your free hand to guide a screw. Although the hammer drill was the heaviest of the bunch, it was comfortable to use. Unfortunately, the battery has to be on the tool to register the level of charge remaining. Other than that, this kit is almost perfect.

**Makita
XT252T**

PRICE \$459
BATTERIES 5 Ah
WARRANTY
3 years (tools)
1 year (batteries)

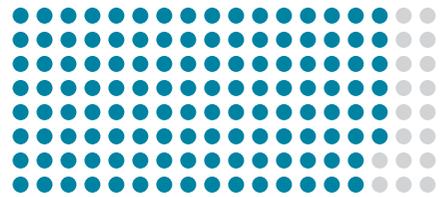


64 Concrete holes drilled



Holes per Ah: 13
Time per hole: 32 seconds

126 Structural screws driven



Screws per Ah: 25
Time per screw: 4.5 seconds

and brushless motors, see "How It Works," *FHB* #226).

Batteries vary

While all kits in this test contained lithium-ion (Li-ion) batteries, not all batteries had the same amp-hour rating. The higher the amp-hour rating, the more fuel the battery can hold. A higher amp-hour rating doesn't make the motor more powerful or increase performance; it simply means the battery has a longer run time. The tested kits have batteries ranging from 2 to 5 amp-hours (Ah).

Because of this variation, comparing the number of holes drilled or fasteners driven

without some interpretation is not that meaningful. For each kit, then, I compared the number of holes drilled and fasteners driven to its batteries' amp-hour rating. This allowed me to evaluate performance on a more-level playing field. I also included the gross numbers because they matter, too, especially since batteries are a large part of a cordless platform's overall cost.

Shared features

The tools in all six kits in this test share many features. They come with some configuration of LED worklights, although the positioning and the number of lights vary,

and some work better than others. All tools have a metal belt clip that can be mounted on either side of the tool.

Impact drivers are great for installing large screws and bolts and for tightening nuts. At full power, though, they're not well suited for smaller screws and tightening up delicate hardware, so all of the drivers except the DeWalt and the Rockwell have controls that slow the motors for greater precision when needed. This feature allows the same impact driver to go from installing ledger bolts for a deck to tightening canopy screws for a ceiling fan. Changing this setting is as easy as pushing a button.

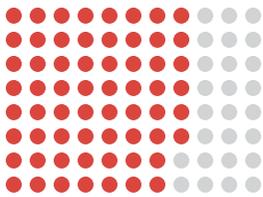
MILWAUKEE has several battery options, including 9 Ah—the industry’s largest—and there are more than 40 tools in its 18v Li-ion lineup. The impact driver’s chuck allows you to lock in a bit without pulling a collar. The LED light above the trigger provides plenty of illumination, but like all lights located in this position, shadowing can be an issue. There are three speed/impact settings, and the grip is comfortable, even during extended use. The hammer drill is heavier than most of the others but is well balanced and comfortable to use. This kit is one of my favorites in the test. The only problem is the blow-molded case, which, despite its size, lacks any real storage space for bits and accessories.

**Milwaukee
2797-22**

PRICE \$350
BATTERIES 4 Ah
WARRANTY
5 years (tools)
3 years (batteries)

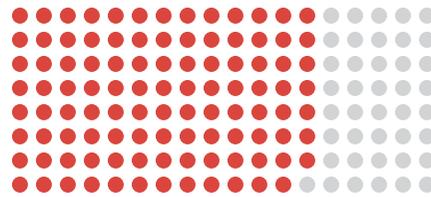


62 Concrete holes drilled



Holes per Ah: 16
Time per hole: 23 seconds

103 Structural screws driven



Screws per Ah: 26
Time per screw: 5.2 seconds

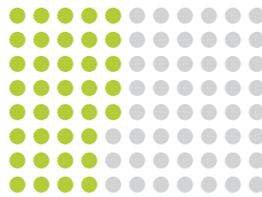
ROCKWELL has 2-Ah batteries and offers just two other tools in its 20v Li-ion lineup: an oscillating multitool and an impact wrench. This is the kit’s biggest downside, as both the impact driver and the hammer drill offer performance and run time on par with better-known brands. The impact driver feels a little top heavy and is slightly larger than the other impact drivers. The single LED above the trigger provides decent light, but it doesn’t have the beam spread of the tools with multiple LEDs. The chuck requires two hands to insert a bit. The hammer drill is well balanced and comfortable to use, and its single LED above the battery illuminates the work area well. This kit is best suited for someone who needs only an impact driver and a hammer drill. One huge perk: If you register the tool, Rockwell offers a 20-year warranty, including batteries.

**Rockwell
RK1807K2**

PRICE \$275
BATTERIES 2 Ah
WARRANTY
20 years (tools
and batteries)

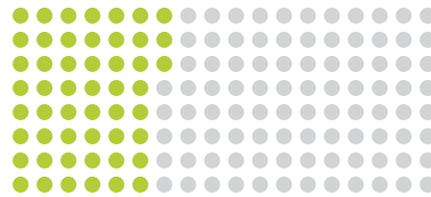


37 Concrete holes drilled



Holes per Ah: 19
Time per hole: 28 seconds

51 Structural screws driven



Screws per Ah: 26
Time per screw: 4.5 seconds

All of the hammer drills have two speeds and multiposition clutches.

Top picks

The two kits that I reached for the most were the Makita and the Milwaukee. The Makita impact driver fastens more screws faster than any other impact driver tested, so its kit is my pick for best overall. Because the Milwaukee kit costs \$109 less than the Makita, I made it my best-value choice. □

Jeremy Hess is a remodeler in Elizabethtown, Pa. Photos by Patrick McCombe, except where noted.



How we tested

In addition to using the kits on my job sites for several weeks and loaning them to friends in the trades for their input, I did some standardized tests to check battery life and drilling/driving speed. To test the impact drivers, I drove 3/8-in. by 5 1/8-in. GRK structural screws into a pressure-treated 6x6 post. Starting with a fully charged battery, I ran the big screws one after another until the battery’s electronic circuitry cut power to the motor. I did three trials of each tool and averaged the results. To test the efficiency of the hammer drills, I drilled 1/2-in. holes into 4-in. solid concrete blocks until the batteries died. In this case, I did two trials and averaged the results.