TOOL TEST

Heavy-Duty 18-Volt Drill/Drivers

The top models are serious drilling machines, with added features that make the job easier

by Bruce Greenlaw

If I could own just one cordless drill/driver, it would be a full-size 18-volt lithium-ion model. Priced at about $260 and up, these muscular tools ship with 3-amp-hour or larger batteries for extended runtime and weigh 4.2 to 5.5 pounds. (Their compact 18-volt cousins, by comparison, weigh 3.3 to 4 pounds and cost about $150 and up.) Armed with one of these ½-inch models, I can power my hole saws, midrange auger bits, or the biggest spade bits all day if necessary without pushing the limit. I can also sink long deck and structural screws when an impact driver isn't readily available.

Ideally, I'd pair this tool with a 12-volt subcompact, a category I tested for *JLC* several months ago ("12-Volt Drill/Drivers," 6/11). Subcompacts weigh just 2.6 pounds or less and can ride in a toolbelt or a pocket, yet can repetitively drill holes up to about ¾ inch in diameter. Together, the two tools can comfortably handle almost any drilling job I encounter.

For this article, I evaluated nine full-size 18-volt drill/driver kits: the Bosch "Brute Tough" DDH181-01, the DeWalt "20V Max" DCD980L2, the Festool T 18+3 Set, the Hilti SF 18-A CPC, the Hitachi DS18DL, the Makita "LXT" BDF451, the Metabo BS 18 LTX, the Milwaukee "M18" 2610-24, and the Panasonic "Tough IP" EY7450LR2S. After driving long screws and drilling several thousand big holes, I've sized up their overall performance and features.

(text continues on page 4)

Drill/Driver Specs

	Bosch DDH181-01 877/267-2499 boschbestbuilt.com	**DeWalt** DCD980L2 800/433-9258 dewalt.com	**Festool** T 18+3 Set 888/337-8600 festoolusa.com	**Hilti** SF 18-A CPC 800/879-8000 us.hilti.com
Weight with/without side handle (in pounds)	5.04/4.69	5.63/5.22	NA/4.21	6.14/5.52
Length (in inches)	8 5/16	9 3/8	8	9 3/4
Rpm	0–380/0–1,600	0–575/0–1,350/0–2,000	0–450/0–1,500	0–370/0–1,250/0–2,140
Charge time (in minutes)	30	60	45	48
Web price	$290	$260	$625 ($500 for basic kit)	$400
Included in kit	2 batteries and charger; side handle; magnetic bit holder; Phillips insert bit; plastic case	2 batteries and charger; side handle; plastic case	2 batteries and charger; FastFix keyless chuck, angle attachment, and eccentric attachment; Centrotec chuck and 4-mm twist drill; magnetic bit holder; Phillips insert bit; belt hooks; Systainer plastic case	2 batteries and charger; side handle; plastic case or contractor bag
Warranty	1-year for tool, battery, and charger; 1 year free service; 30-day satisfaction guarantee; Register for free ProVantage plan (3-year tool, 2-year battery, 1-year charger)	3-year for tool and charger; 1 year free service for tool and charger; 3 years free service for battery; 90-day satisfaction guarantee	3-year for tool, battery, and charger; 30-day satisfaction guarantee	Lifetime for tool, battery, and charger defects; 2-year for wear and tear on tool, battery, and charger; fleet-management program
LED headlight	Yes	Yes (20-second delayed off)	Yes (1-second delayed off)	No
Battery gauge	Yes	No	Yes	Yes
Belt hook	No	Sold separately (N086039)	Yes	No
Bare tool available	Yes	Yes	No	Yes

(table continues on page 3)

(table continued from page 2)

Drill/Driver Specs

	Hitachi DS18DL 800/706-7337 hitachipowertools.com	**Makita** BDF451 800/462-5482 makita.com	**Metabo** BS 18 LTX 800/638-2264 metabo.us	**Milwaukee** 2610-24 800/729-3878 milwaukeetool.com	**Panasonic** EY7450LR2S 800/338-0552 panasonic.com/cordlesstools
Weight with/ without side handle (in pounds)	5.64/5.23	5.34/4.96	5.15/4.71	6.15/5.54	5.24/4.73
Length (in inches)	9 3/16	9 5/16	8 7/16	9 1/4	8 9/16
Rpm	0–400/0–1,600	0–300/0–600/0–1,700	0–400/0–1,400	0–450/0–1,800	0–430/0–1,650
Charge time (in minutes)	45	30	60+	60	65
Web price	$330	$270	$270	$320	$300
Included in kit	2 batteries and charger; side handle; double-end Phillips bit; plastic case	2 batteries and charger; side handle; belt hook; spare-bit holder; 2 double-end bits; plastic case	2 batteries and charger; side handle; spare-bit holder; plastic case	2 batteries and charger; side handle; plastic case	2 batteries and charger; side handle; plastic case
Warranty	Lifetime tool; 2-year for battery; 1-year for charger; 30-day satisfaction guarantee	3-year for tool; 1-year for battery and charger; 30-day satisfaction guarantee	1-year for tool; 3-year for battery and charger; 30-day satisfaction guarantee; Register for XXL 3-year tool warranty	5-year for tool and charger; 3-year for battery; 30-day satisfaction guarantee	2-year for tool; 1-year for battery and charger; 30-day satisfaction guarantee
LED headlight	Yes (on/off switch)	Yes (10-second delayed off)	Yes	Yes	Yes (on/off switch)
Battery gauge	No	No	Yes	Yes	No
Belt hook	Yes	Yes	No	Sold separately (42-70-5150)	No
Bare tool available	Yes	Yes	No	Yes	No

Capacities

All the owner's manuals give drilling capacities, but only DeWalt and Milwaukee break them down for specific types of drill bits. DeWalt says its tool can comfortably power auger bits up to 1¼ inches, spade bits up to 1½ inches, self-feed bits up to 2⁹⁄₁₆ inches, and hole saws up to 4 inches in diameter; in metal, it can power ½-inch twist drills and 1⅜-inch hole saws. Milwaukee's recommendations are more conservative: auger bits up to 1 inch and hole saws up to the lockset-boring size of 2⅛ inches in wood. In the manuals that list driving capacities, the maximum recommended diameter for wood screws ranges from about ¼ to ⅜ inch.

Full-size 18-volt drill/drivers can be significantly bigger and more powerful than their compact 18-volt counterparts. For instance, DeWalt recommends using auger bits up to 1¼ inches and hole saws up to 4 inches in diameter with its premium 20V Max (right), but the numbers drop to ⅞ inches and 2 inches, respectively, for its compact 20V Max (left). That's why most compacts don't have side handles.

To size up the balance between maximum torque and overload protection, the author drove four ½-inch by 8-inch Spax lags as deep as possible into a PSL beam with each tool, then compared the average depth of penetration.

After putting the tools through my trials, I think those numbers are in the ballpark. Equipped with a 1½-inch spade bit, all the tools easily bored holes through 2-by Douglas fir in second gear (third gear in the uniquely configured Makita) in about 8 to 15 seconds. They also propelled my 2⅛-inch bimetal hole saw at high speeds and my 4-inch one at low speeds through ¾-inch plywood sheathing and 2-by Douglas fir, though the 4-incher could take awhile and quickly drain the batteries.

I really pushed the envelope with auger bits. Again using 2-by Douglas fir as my material, I started by drilling a bunch of holes in low gear with 1-inch and 1¼-inch Irwin Speedbor solid-center auger bits. As expected, this was no problem for these tools. They also easily drilled the holes at higher speeds, but in the long run that would put more wear and tear on the drive trains. Next, I exceeded manufacturers' recommendations and tried a 1½-inch nail-eating Irwin Speedbor ship-auger bit, followed by a 1¾-incher. The tools all chewed through the 2-by without stalling or shutting themselves off to prevent overloading. I couldn't resist stepping up to a 2-inch Speedbor ship-auger bit (the biggest diameter available) just to see what would happen. After starting a hole with the Bosch Brute Tough, which seemed capable, I stopped right there, concerned that my wrists might be the first casualty. When it comes to drilling the bigger holes, these cordless tools are no substitute for a corded drill with a safety clutch.

All nine models also had enough power to sink Simpson Strong-Tie's new .22-inch by 10-inch multipurpose structural wood screws into an LVL/LSL/PSL sandwich without pilot holes.

The author tested for runtime by counting the number of holes each tool could drill through 2-by Douglas fir per charge in low gear with a 1-inch Irwin Speedbor solid-center auger bit. All of the drills averaged over 100 holes per charge.

About the Specs

The Festool supposedly generates up to 398 inch-pounds and the Metabo up to 850 inch-pounds of torque. But manufacturers don't use a common test procedure, and in use, the Festool was clearly more powerful than the Metabo. That's why you won't find maximum torque listed in the spec chart on pages 42 and 43.

Weight. I weighed the tools — batteries included — on a postal scale. Then I weighed them a second time, with their side handles attached (except for the Festool, which doesn't have one) because that's the way they're typically used.

Length. To determine lengths, I lightly clamped each tool (with chuck jaws retracted) in a parallel bar clamp and measured the distance between the clamp jaws. The Festool is the shortest.

Rpm. I think this spec — which can have a big influence on productivity — is underrated. The Makita is a good example, because it basically has two low gears: 0–300 and 0–600. At 300 rpm, it bored holes with a 1-inch auger bit through a Douglas fir 2-by in about 5 seconds. At 600 rpm, it took about 2½ seconds.

Charge time. Even though these tools have long runtimes, I still appreciated Bosch's and Makita's speedy 30-minute chargers during my torture tests, because I seldom had to wait for a fresh battery.

Web price. All the kits are available online, but only Hilti sells directly from its own website. For customers who have already bought into their platforms, Bosch, Hilti, Hitachi, Makita, and Milwaukee also sell the bare tool, and DeWalt says it will do so later this year.

Warranty. There's a big difference between Hilti's lifetime warranty and Panasonic's two-year one. Also, Bosch and Metabo improve the terms if you register. All the manufacturers offer a 30-day or 90-day money-back guarantee except for Hilti, which can bring demonstration tools right to your job site unless you live in the middle of nowhere.

Torque and Runtime Tests

After testing these tools for torque and runtime, I've concluded that performance testing can be misleading. But I learned a lot by pushing the tools hard.

To measure maximum torque, I drove four ½-inch by 8-inch Spax self-drilling lag screws as deep as possible into a PSL beam with each tool in low gear. All the drills came well short of sinking the lags, allowing me to compare their depth of penetration. The average scores — in inches deep — from top to bottom were as follows: Makita 4 1/16, Bosch 3¾, Panasonic 3 9/16, Festool 3 7/16, Milwaukee 3 3/16, DeWalt 3, Hilti 2 13/16, Hitachi 2 11/16, and Metabo 2 7/16.

The two top scorers — the Makita and the Bosch — drove the lags until they slowed to a stall; neither tool shut itself off automatically to protect against overloading. Though the Bosch seemed to handle that well, the Makita's motor got so hot I could smell it. The rest of the tools drove until they shut themselves off; to reset them, I just released the trigger. Among these seven tools, a lower score could simply mean that the model offers superior protection against abuse.

I tested for maximum runtime by counting the number of holes each tool could drill through 2-by Douglas fir per charge with a 1-inch Irwin Speedbor solid-center auger bit. Each drill was tested twice — once with each of the included batteries — in low gear at room temperature. To help ensure reasonable accuracy, I distributed the holes over four 2x12s, avoided the knots, and stopped drilling when the drill bit's screw point punched through. I also kept the bit clean with Blade & Bit pitch remover. The average test scores, in number of holes, were as

A Closer Look

Three-speed trannies. The DeWalt, Hilti, and Makita (left to right) have a three-speed — rather than the usual two-speed — transmission. Makita's extra gear adds a second low-speed option for drilling big holes and other high-torque applications, while DeWalt's and Hilti's add a second high-speed option for less demanding applications like small-diameter drilling in metal.

Drill/drive switches. The Makita (shown), DeWalt, Festool, and Milwaukee allow you to switch between drilling and driving without losing your clutch setting.

follows: DeWalt 149, Festool 146, Panasonic 141, Hilti 138, Hitachi 129, Bosch 115, Makita 112, Milwaukee 104, and Metabo 104.

There was, however, a red flag: The two scores for a given tool could vary by up to 24 holes, indicating that my final numbers aren't particularly exact. Nevertheless, the tests did demonstrate that each tool could drill more than 100 1-inch holes per charge, and every tool except the Metabo was able to drill nonstop with no apparent overheating of the tool or either battery. The Metabo, by contrast, heated up quickly and shut itself off after the first 44 holes. After that, I had to rest it repeatedly to reach the finish line, at which point the torque switch and gearbox were too hot to touch. The tool also overheated with the second battery.

All the tools except the Makita shut themselves off before draining completely, to prevent potentially harmful deep discharge. Still, it's easy to tell when a tool starts to lose power and it's time to recharge.

Tester's Comments

Bosch DDH181-01. Only the Festool is lighter and shorter than the new Brute Tough model from Bosch. In addition to handling my trials with ease, the Bosch has a comfortable grip and side handle, a battery gauge, a well-placed headlight, and a solid warranty. It comes with a 30-minute fan-cooled charger that's helpful for serious production work. As for nitpicks, there's no belt hook, the clutch collar is a bit slick, and the rubber friction sleeve slipped out of the side handle twice when I removed the handle, making me think it could get lost. The batteries will supposedly perform down to -4°F, but there's no easy way to confirm that in my coastal California environment.

DeWalt DCD980L2. This tool is part of the new 20V Max series, which is powered by 18-volt slide-type batteries that are incompatible with DeWalt's other 18-volt lithium-ion platform. It costs less (at the moment) than the other models I tested, but it's a strong three-speed performer with a fast 575-rpm first gear that I especially liked when using mid-size auger bits. The tool can also switch between drilling and driving without losing the clutch setting. The headlight stays lit for 20 seconds after you release the trigger, a welcome feature in the dark. On the downside, the side handle has a plastic grip, there's no battery gauge, it takes up to an hour to recharge the batteries, and the belt hook is sold separately. The metal ratcheting chuck can jam in the fully open position, though you just have to turn the collar counterclockwise slightly to free it up.

Festool T 18+3. When I first saw the small and lightweight Festool, I thought it would get blown away by its brawnier competition. But it easily handled all my drilling and driving trials, with ample runtime and sensible protective circuitry. Its advanced brushless motor and fully electronic dial-operated clutch are very quiet, and you can switch between drilling and driving without losing a clutch setting. The tool has a battery gauge and a belt hook, and it holds spare driver bits. The complete set I tested features the unique FastFix chuck system, which includes the keyless chuck, an offset and right-

A Closer Look

Festool attachments. The complete Festool kit includes FastFix offset and right-angle attachments for working in tight quarters.

Headlights. All the tools except the Hilti have LED headlights, all of which illuminate the point of a standard spade bit with no shadows. From left: Bosch's trigger-activated light is in the base so the chuck won't cast a shadow on your target when you're using short bits. Panasonic's base-mounted light turns on and off with a push button and shuts itself off after the tool idles for five minutes. Hitachi's push-button amber light is built into the belt hook and requires separate batteries. It automatically shuts off in 15 minutes. Makita's top-mounted, switch-activated light stays on for about 10 seconds after you release the trigger.

angle attachment, and a Centrotec quick-change chuck that accepts only Centrotec drill, driver, and countersinking bits and bit holders (including a bit holder that drives standard ¼-inch hex-shank insert bits). An optional depth-stop chuck is also available. You can buy the tool without the right-angle and offset attachments to save $125, but you'd still be spending a pretty penny while losing the versatility. Unfortunately, there's no side handle for this tool, which makes controlling all that power unnecessarily difficult.

Hilti SF 18-A CPC. The Hilti is the longest and one of the heaviest models in the group. But it's really a 21.6-volt tool, containing two extra cells in the battery pack. In use, it feels like a strong performer; sensitive protective circuitry should help extend its lifespan. It has a fuel gauge on the batteries, a three-speed transmission, and an extra-long and comfortable side handle that locks firmly in 15 positions. You can order it with either a plastic case or a big contractor bag that can store the tool with its side handle attached and plenty of big bits. But the tool doesn't have a headlight — which one of my plumber friends would consider a deal killer — and there's no belt hook available. Also, the drill costs $400, which is exceeded only by the more versatile Festool.

Hitachi DS18DL. Hitachi's drill — with active protective circuitry — performed in the middle of the pack. The metal ratcheting chuck spins open and closed beautifully by hand for speedy bit changes, and you can store spare bits below the handle. But the tool has the only post-type battery in the group, which makes the handle uncomfortably fat near the base. The dim amber LED headlight is built into a bulky pivoting plastic belt hook and is powered by separate AAAA batteries. Hitachi's specs indicate four speed ranges, but the tool actually has a two-speed transmission; flipping the white switch on the handle prevents you from fully squeezing the trigger in both gears, which supposedly gives you two extra speed ranges. Finally, the clutch collar gets so stiff it can be a chore rotating it to the drilling symbol.

Makita BDF451. This tool hit the market in 2005. It lacks electronic protection against overloading and deep discharge, and doesn't have a battery gauge. But it does have bright dual headlights with a 10-second afterglow when you release the trigger, a drill/drive switch that preserves your clutch settings, a comfortable side handle, a reversible belt hook, and a removable spare-bit holder. Its three-speed transmission gives you two low gears, allowing you to find the sweet spot for drilling the biggest holes. The 30-minute battery charger is first-rate. Less impressive is the jumbo blow-molded case, which accommodates a phantom impact driver.

Metabo BS 18 LTX. Not only was this drill/driver noticeably less powerful than the other tools I tested, but it was the only one that ran hot and shut itself off during my grueling runtime trials. It spins up to 1,400 rpm in second gear, the slowest top speed available. Also, its chuck — like DeWalt's — can jam in the fully open position, though you just have to turn the collar counterclockwise slightly to free it up. The tool has no belt hook, and it can be hard to tighten the side handle enough

A Closer Look

Battery gauges. Bosch, Festool, Hilti, Metabo, and Milwaukee have onboard battery gauges so they won't quit right after you crawl into an attic. Festool's gauge is located on the back of the tool, while the rest are located on the batteries so you can check their charge on or off the tool.

Chargers. All nine battery chargers are diagnostic, but some are faster and more sophisticated than others. Makita's fan-cooled 30-minute charger indicates an 80 percent charge so you can finish a job without waiting unnecessarily, and you can select a beep or a ring tone that announces a full charge. A spring-loaded plastic cover protects the terminals.

to prevent it from slipping. On the bright side, the Metabo is one of the shortest and lightest models, and it has a fuel gauge on each battery.

Milwaukee 2610-24. During my runtime trials, the Milwaukee repeatedly blinked off when I pulled the trigger, and the chuck stiffened up and become difficult to adjust. After I finished my testing, I shipped the tool to an authorized service center in Oregon, which promptly replaced the switch and tightened the chuck screw. The repair tech told me that this was the first time he had come across that switch problem, but he had seen lots of loose chuck screws on new Milwaukee drill/drivers. If you buy one, you might want to check that. Milwaukee also sent me a second tool, and I repeated my testing without a hitch. Troubles aside, I really liked this drill's power and speed, and the fuel gauge on the batteries. But it's the heaviest model, the side handle has a hard plastic grip and locks in just four positions, and you have to pay extra for a belt hook. Plus its charger is slow (60 minutes).

Panasonic EY7450LR2S. The "ToughIP" label on this model refers to the IP code created by the International Electrotechnical Commission to classify a product's resistance to dust and water. According to Panasonic, this tool's IP56 rating means that dust won't interfere with its operation or impair safety, and that powerful water jets will have no harmful effects. The comparatively lightweight tool was a top performer in my performance trials and has sophisticated protective electronics, including overheat protection that will shut off the tool if necessary and then allow you to resume at 50 percent power until the motor cools. The base-mounted headlight turns on and off at the press of a button (you have to tap the trigger first before turning the light on) and shuts itself off after the tool idles for five minutes. That means you can set the tool down and use it as a temporary task light in a pinch, or leave it off when you don't need it. Too bad there's no onboard battery gauge or belt hook and its charger is among the slowest. Also, the tool tips forward more easily than the others.

The Bottom Line

Most of these tools do a great job of drilling big holes. For my general remodeling needs, the new Bosch Brute Tough is my top pick. It costs less than $300 yet has abundant power and runtime. It's relatively short and lightweight, includes all the basic amenities except for a belt hook, and offers a ProVantage warranty that includes quick replacement of defective tools and batteries. It also accepts Bosch's lightweight SlimPack batteries for jobs where maximum runtime isn't an issue.

I wouldn't buy the Hitachi, because of its numerous quirks; nor would I choose the Metabo, because it overheated when I pushed it hard. I loved the advanced and versatile Festool, but any tool that can power a 1¾-inch auger bit needs a side handle, and Festool doesn't offer one. I would do just fine with any of the other five models. The best choice for you, however, depends on your needs.

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A Closer Look

Belt hooks. Only the Festool, Hitachi (at left above), and Makita (at right above) come with belt hooks; DeWalt and Milwaukee sell them separately. To adjust Festool's dual battery-mounted version (left), you simply slide it back and forth.

Contractor bag. Hilti's kit includes either a plastic case or an optional contractor bag. The bag is roomy enough to store plenty of big drill bits and other tools, and it can hold the drill/driver with the side handle attached so you don't have to keep installing and removing it. You also don't have to waste time tucking in the charger cord, as you do with most plastic cases.