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Review: HP DesignJet Z2100 Printer

This 24" large-format printer is amazingly well-designed and well-constructed. It's also speedy and easy to use. But the true measure of a printer is its output quality. How does the Z2100 compare to its Epson and Canon rivals?

By Ben Long, creativepro.com senior editor
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Rating: 95
Pros: Excellent output; well-designed software; built-in colorimeter; no ink swapping; archival

Cons: Paper handling with smaller sheets can be a little flaky; ink and paper are not currently in the usual retail channels

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There's been a lot of big digital photography news over the last year and a half, but most of the products in the headlines have been software programs: Aperture, Lightroom, Photoshop CS3, and so on. Lost in the shuffle has been an equally important story: HP is now serious about fine-art printing. In the last several months, it has released the B9180, a 13" desktop printer, and the DesignJet Z2100 and Z3100, two large-format printers. These products have the potential to dramatically reshape the fine-art printing landscape.

For serious photographic printing, Epson has been the vendor of choice for years. Offering the first printer that was truly archival, the first archival printer with quality grayscale printing, and long providing the ability to output true photo quality on a range of glossy and matte photographic media, Epson has held the top photo printing spot for good reason. All of that makes HP's achievement with the large-format DesignJet Z2100 even more impressive.

An eight-ink printer, the Z2100 (Figure 1) is available in 24" ($3,399) and 44" ($5,599) models. I reviewed the 24" unit, but besides price, the only difference between it and the larger model is maximum paper width. The Z2100 uses HP's Vivera pigment inks, which have archival ratings that are slightly better than Epson's K3 pigment ink system. The Z2100 employs cyan, magenta, yellow, light cyan, light magenta, light gray, and either a photo or matte black, depending on what type of paper you're printing on. All inks are loaded simultaneously.

Figure 1. The Z2100 ships in 24-inch and 44-inch wide versions. I tested the 24-inch model.

Setup

The Z2100 is a sturdy, well-built piece of hardware. You'll first be clued in to that fact when the printer arrives. The roughly 200-pound box ships on a forklift palette. HP's documentation recommends three people to safely move the package around, though you can manage with two with a little bit of work.

However, thanks to excellent package design, you may not need to move the box at all. Following the very clear instructions, you remove a few components from the package, and then disassemble the box from around the printer. When you've stripped the packaging away, you find the main body of the printer resting upside-down on the bottom part of the box. After assembling the printer stand—a simple process that's quickly completed using the included Torx screwdriver—you bolt the stand to the bottom of the printer. Because the printer is lying bottom-up, it's easy to attach the stand. You then pivot the printer into a normal standing position, and you're ready to roll it off to wherever you want to keep it.

All of this thoughtful packaging and product design assumes that burly movers have already delivered the printer box to the floor where you want the printer to stay. In my case, I needed to get the printer up three flights of stairs, which required a kind friend and a little lifting, shoving, sliding, and cursing. Nevertheless, HP is to be commended for thinking through every step of the printer assembly process and arriving at a design that minimizes lifting and sweating.

The included stand feels solid, and its wheels roll very easily. You'll regularly need access to the back of the Z2100, so smooth rolling is essential for everyday use.

The 24" Z2100 measures approximately 50" wide by 30" deep and stands around 41" high. Needless to say, you'll need a fair amount of room for this printer, including space behind it for paper loading and management. The printer and stand weigh in at 143 pounds.

Though it's large, the bulk of its space is in width, not depth, so you can slide it up against a wall when you're not using it. In many ways, the Z2100 feels smaller than some of it competition, such as the Epson 4800 and the Canon imagePrograf IPF 5000, which are both much deeper (and only print 17" wide).

After you've taken care of the hardware, you plug in the power and prepare to load the print heads and ink tanks. Each of these parts is keyed so that it can't be installed incorrectly, which makes setup virtually foolproof. Unless you try to force something—really hard—you can't mess up the printer. With all of the heads and inks in, the printer goes through an automated priming and diagnostic phase, which takes about 30 to 40 minutes. You don't have to do anything during this period, which gives you plenty of time to go back to your computer and install the driver software.

The Z2100 includes both USB-2 ports and full networking via a standard Ethernet port. No external print server devices are required, as was the case with some of HP's older large-format DesignJets. I tested the Z2100 using the Mac OS, which had no trouble immediately locating the printer on the network.

The verdict: The Z2100 raises the bar high for setup and configuration. It's hard to imagine a device of this size and complexity being any easier to unpack, configure, and deploy.

Paper Handling

There's a reason the Z2100 weighs so much: it's solidly built with metal casings and a heavy chassis. There is nothing about this printer that feels cheap or plastic. Every door and finish feels high-end and sturdy.

The 24" version of the Z2100 can handle paper up to—you guessed it—24 inches wide. The built-in roll feeder can accommodate rolls up to 300' long, and it includes adapters that let you use 2" or 3" cores. Thicker, less flexible paper comes rolled onto a wider core so it doesn't have to be wrapped as tightly.

To load a roll of paper, you put it on the spindle and snap the spindle onto the roll mount on the back of the printer. With the printer powered on, you feed the start of the paper into the paper slot on the back of the

printer. The Z2100 automatically detects the paper, grabs it, pulls it in, and checks that it's aligned properly. Because you don't have to press any additional buttons, loading the paper is very easy and simple to do by yourself. A 24" roll is small enough that it's easy to handle and load without worrying too much about getting your hands on the print surface. Unfortunately, HP ships its papers with a big piece of tape holding down the top of the page. This effectively renders the first few feet useless, so you'll need to spool those out.

To load a sheet, you must first unload the paper roll, which you can do from the printer's front panel interface. Unloading just means that the printer spools the paper backward, out of the paper path, freeing it up for sheet feeding.

I found feeding of larger sheets (13" x 19" and larger) to be quite simple. Smaller pages (less than 8" x 10") were a little more problematic, with the printer sometimes failing to recognize the paper as loaded, and the printer driver not acknowledging useful media. These problems were never unsolvable; they just required a few attempts at loading. I don't consider this a huge problem because, simply put, this is a large format printer. If you want to print smaller pages, you'll have an easier time working with a desktop printer that has a cartridge that can accept stacks of pages.

Whether you're using sheets or rolls, upon loading you must use the front panel menus to tell the printer what kind of paper you've loaded. This allows it to keep track of profiles and other paper-specific settings and configurations.

The verdict: Loading is easy, and I was impressed with the paper handling. A large apron hangs off the front of the printer and catches prints as they come out of the printer. For a large-format printer this is an essential accessory, and the Z2100's apron can pivot out of the way when you're not printing, making for a unit with a lower profile.

Closed-Loop Calibration

Like its smaller cousin, the Photosmart B9180, the Z2100 employs a closed-loop calibration system. Calibration is not the same as profiling, something I'll discuss in more detail later. Rather, it's the process of ensuring that the print heads are performing to spec, with all their nozzles firing in the expected manner. The Z2100 has replaceable print heads, unlike Epson printers, which have stock, factory-calibrated print heads that are intended to last the life of the printer. The Z2100 continuously monitors its print heads (there's one for each ink color) to keep track of nozzles that might have clogged. These nozzles are automatically deactivated, and when enough of them fail, the printer tells you to replace the head.

When you first use a specific paper type with a set of heads, you need to calibrate the printer. This is a fully automated process whereby the Z2100 prints out test swatches, then pulls the page back into the printer, scans it, and ensures that the print heads are delivering the expected results.

Some users choose to calibrate every day, to ensure that their printer is delivering absolutely consistent results. HP recommends calibrating any time you change ink cartridges, and definitely any time you replace the heads.

If replaceable heads sounds like more stuff you have to buy, don't worry. The heads will last a long time. You can expect to get hundreds of large-format prints before seeing any head failure. What's more, the process of calibrating uses a negligible amount of ink, so head calibration doesn't mean additional ink costs.

HP recommends leaving the printer powered up all the time. This gives it the opportunity to automatically test its heads at regular intervals and perform automatic maintenance and analysis. Ink usage in this process is minimal, and power consumption is low. However, the printer's fan stays running all the time, which makes it somewhat noisy.

The verdict: My experience leads me to believe that HP's removable head system is superior to Epson's in terms of convenience and usability. In four months of printing I haven't had a single head clog and have yet to run any maintenance on the heads. The goal of head calibration, whether user-controlled or performed at the factory, is consistency from print to print. Neither scheme appears to offer any advantage in terms of consistency, but as far as the hassle of head clogs (and the expense of wasted ink used to clean heads), HP has a strong advantage.

It Slices! It Dices! It Builds ICC Profiles!

The 24" Z2100 lists for $3,399, which is about $400 more than Epson's competitor, the Stylus Pro 7800. However, the Z2100 includes a built-in Gretag Macbeth EyeOne Colorimeter and all of the software you need to automatically generate ICC profiles for any paper you want to shove through the printer.

A stand-alone Eye One system costs around $1,000, and that won't include any kind of automation. So, if you figure that you're getting a paper profiler along with your printer, the Z2100's price starts to appear very reasonable.

What's the advantage of having your own profiler? After all, the printer ships with profiles for all of HP's standard papers. However, those profiles are somewhat generic, and there can be variation from one unit to the next. The closed-loop calibration system takes care of most unit-to-unit variation—in most cases, I couldn't see a difference between calibrated and uncalibrated prints, indicating that the Z2100 ships from the factory already calibrated to tight tolerances. But if you're running a color-managed system and you're a stickler for reproducible results, you'll want to create profiles for your specific unit.

But the greatest value in having your own colorimeter comes when you want to use a non-HP paper.

It's the rare inkjet user who doesn't, at some point, wax conspiratorially about printer vendors reaming their customers with ink and paper prices. Obviously, the profit for the printer vendor is in consumable sales. Therefore, it's even more amazing that HP is essentially saying, "You'd like to print on that non-HP paper? Here, let me help you."

Building a profile is a completely automated process that you can initiate from the front panel controls, or from the printer driver itself. If you imagine your ideal automatic paper profiling scenario, you've probably got a pretty good idea of how paper profiling works on the Z2100. You load your paper into the printer and start the calibration process. The Z2100 prints out a calibration target of around 500 little swatches, lets it dry for five minutes, then pulls it back into the printer and performs its calibration.

The colorimeter is mounted on the print head carriage, and you can watch it pass over each swatch for a reading. The swatch pattern itself is thoughtfully designed as a series of hexagons, rather than as a grid pattern, resulting in less paper use.

The printer then takes this data, builds a standard ICC profile, and stores it on its own internal 40GB hard drive. Yes, the printer has a 40GB hard drive built in. (If it just had speakers, you could use it as a really big iPod!)

What's even cooler, though, is that you can start the process from directly within the HP printer driver. Let's say you're printing an image and want to use new paper. You load the paper in the printer and hit Print, as you normally would. The driver recognizes that there's no profile available for your installed paper and asks if you'd like to make one. If you say yes, then it automatically loads the paper, makes a profile, stores the profile on the printer's hard drive, and installs a copy of it on your computer. The profiling process takes about ten minutes, and when it's done, the Z2100 prints your document using the new profile.

You'll find this level of well-conceived automation throughout the Z2100's software. For example, if you access the printer from a different computer on your network, it informs you that a new profile is available and automatically installs it for you.

Profile quality is very good, certainly as good as anything you'd get from a typical $1,000 to $2,000 profiling package. The fact that you don't have to manually scan patches makes the Z2100's colorimeter even more appealing.

If you're especially picky about your profiles, you can opt to buy the Advanced Profiling Solution, a software package that adds more refined profiling—using a target with around 1,000 patches—as well the option for CMYK profiling.

The verdict: No matter how good the printing technology is in a particular printer, if you send inferior data to the unit, you'll get inferior prints. The Z2100's ability to profile papers for you greatly improves your ability to get good prints that match your screen (assuming you're running a calibrated, profiled system). This is a great addition that adds tremendous value.

Software

As with the rest of the Z2100, HP has done an excellent job with the printer driver. It's readily apparent that someone at HP has spent a lot of time printing—and, more specifically, a lot of time printing with Photoshop—and has paid attention to which driver controls you want access to at what time. The driver dialog is very well organized. Essential controls, such as paper choice and color controls, are all in the same pane, so navigating the printer dialog is very speedy.

The Z2100's software goes beyond just the printer driver, though. The printer itself has an onboard Web server and email server. From any Web browser on your network, you can access a panel that offers full control over printer settings, order of jobs in the queue, and more. The Web interface provides full accounting of all jobs, showing precisely how much ink and paper was used for each print, making it easier to handle expenses between multiple departments. If you have your own server, you can configure the printer's mail server to automatically mail you when a job is complete (ideal for a user who works in a different building or department from the printer) or when the printer has experienced an error.

The verdict: When HP originally demo'd this printer for me, they showed a Photoshop plug-in that provided a single dialog box with an extremely streamlined printer interface. While the B9180 ships with such a plug-in, the Z2100 version hasn't yet seen the light of day, which is too bad. Hopefully HP will release this at some point. Even without it, though, the HP software is excellent, with a refined attention to detail and a broad feature set.

Quality

Ultimately, it's print quality that defines the merit of a particular printer, and the Z2100 delivers beautiful output on matte or glossy paper. I was very impressed with the printer's gamut, especially at the brighter end of things. (Brightness is often a problem with pigment printers.) Detail is excellent, with no visible dithering patterns, even in bright highlight areas.

Grayscale output is also top-notch, offering truly neutral grayscale images that are free from color casts and metameric shift. The Vivera inks have a broad grayscale range, thanks to their two blacks.

I tested using both Photoshop-driven color and driver-generated color and found that the driver generally delivered better results than Photoshop. Photoshop's soft proofing is useless when using driver color, but I never find that it works particularly well anyway. Being able to rely on driver color makes for a much simpler printing experience, and the fact that the printer can generate its own profiles means you aren't limited to using only paper supported by the driver.

Another nice feature of the Z2100 is that you don't have to swap black ink when changing from matte to glossy paper. This is a huge hassle with some Epson printers, and it consumes a fair amount of ink.

Ink usage is extremely economical on the Z2100, and the printer is very speedy, delivering a 24" x 36" print in around five minutes.

These days, comparing printer output is something of a hair-splitting game. The fact is, you'll see little difference between the Z2100, the Epson 7800, and the Canon imagePROGRAF iPF 5000. You'll be hard-pressed to find a consistent, reproducible difference between the Z2100 and the 7800, and for those times when you do see differences, you'll probably find that you can easily skew one print to match the other. However, the Z2100 is superior to Canon's output in terms of overall color, sharpness, and lack of artifacts.

The Z2100's prints are very durable, though glossy output scratches easier than matte prints. The Z2100 is also capable of full borderless printing.

A more complicated question is the comparison between the Z2100 and HP's more expensive Z3100, which offers additional black inks, a slightly different set of colors, and a gloss optimizer. The extra colors provide a slightly wider gamut, while the black inks allow for quad-tone grayscale printing. The gloss optimizer provides a more even finish on glossy papers.

On most prints, you probably won't see a difference between the Z2100 and the Z3100. But on more difficult images, large-gamut images, or very refined grayscale images, the extra colors provided by the Z3100 give you some extra latitude to work with. However, this extra capability costs an additional $1,000.

The verdict: The Z2100's prints are better than those from the Canon imagePROGRAF iPF 5000 and equivalent to those from the Epson 7800. Output from HP's Z3100 can be better than the Z2100, but the Z3100 is more costly.

Media

HP's supported media offers further evidence that the company has been paying close attention to the fine-art printing market. A huge range of glossy, matte, and fine-art papers are available for the Z2100, including HP-branded versions of popular third-party media, such as some Hahnemuhle fine-art papers. HP's included profiles and calibrations for these papers are excellent, so you can get good results right out of the box.

It's a little ironic that the first printer that has a built-in colorimeter also provides excellent built-in support for a huge variety of papers. Because HP's paper supply is so good, you may not find yourself using many third-party offerings. However, it's still nice to have the option to build your own profiles.

One downside to HP's late entry into the fine-art printing world is that it's tough to find HP media in the usual outlets. Even high-end camera stores have been slow to carry HP ink and paper, which means you'll probably be ordering the bulk of your media online. Fortunately, HP offers free overnight shipping on many of their ink and media products. Currently, Amazon seems to have the lowest prices on ink.

The verdict: Though you won't find most of them at your local store, there's a wide range of media to use in the Z2100.

The Last Word

The DesignJet Z2100 is a well-designed, well-implemented printer that's capable of producing stunning images. At $3,399 it's something of a bargain, given its built-in colorimeter. If you're looking for large-format output, it's a must-see printer, and currently the strongest offering in its category. It's also proof that HP is now a major player in the fine-art printing world.