

Introduction

Many businesses can get by sending their occasional oversized print jobs to a copy shop. However, if you often print blueprints, banners, or other documents over two feet wide, investing in a wide-format printer or plotter can be a good choice. These machines can print in color or black and white, on a wide range of materials, in widths of 24" to 60" or more.

There are two main markets for wide-format printers and plotters. The first, the **architecture, engineering, and construction** (AEC) market, has long been buying plotters for blueprints and other technical documents.

More recently, **print and design shops** have begun investing in wide-format printers to create large-scale banners, signs, and other outdoor durable graphics or textiles without turning to a printing press. Educational institutions, advertising agencies, and even large retail stores are also turning to plotters.

This **BuyerZone Plotters Buyer's Guide** will give you the inside scoop on the basics of choosing a wide-format printer, what features to look for, and how much you can expect to pay.

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Pricing guidelines

Here are some rough guidelines on wide-format printer costs: your costs could vary considerably. More details are on page 7.

Type of System	Notes	Estimated cost
Low-end	For basic posters, up to 24" wide	\$1,300 to \$4,000
Mid range	Professional results, LED or inkjet	\$6,000 to \$15,000
Color inkjets	Commercial quality	\$15,000 and up
Color LEDs	Newer technology	\$30,000 and up

LED and Inkjet printers

The two primary technologies used in modern wide-format printers are LED and inkjet. **LED printers** are very similar to laser printers and copiers: they use a drum to transfer dry toner onto the print surface, and fuse the toner to the paper using heat. Wide-format printers use LEDs as the heat source instead of the lasers found in standard business printers.

Wide-format **inkjet printers** are functionally similar to their smaller cousins. They come in two basic varieties: **thermal** inkjets use heat to apply droplets of ink, **piezoelectric** inkjets use electrically-charged crystals instead. In both cases, the technology combines small dots of ink to create a wide range of colors.



Until recently, the most significant distinction between the LED and inkjet printers was that LED printers could be used as multifunction scanner/copiers in addition to printers while inkjets could not. Now, some manufacturers are introducing upgradeable inkjet printers that can copy and scan, so this difference is becoming less important.

Your application may determine your decision between the two technologies.. LEDs are more common in AEC applications, while companies with graphics applications (i.e., signs, advertising, banners) lean towards inkjets (see **Choosing a wide-format printer** below for more). Until recently, inkjets were the only choice for color

printing, but some newer LEDs have added color capabilities.

Other differences between LED and inkjet printers are familiar to anyone who has evaluated standard business printers. For example, LED printers, like smaller laser printers, are generally faster than inkjets. Comparing speed can be tricky, though. Inkjets are often rated in square feet per hour, or the number of D size (24" by 36", a standard tech document size) prints per minute. LED printers are sometimes rated in linear feet per minute instead. Get the dealer to translate the speeds into the same measurements so you can easily compare.

The cost differences are similar to standard business printers, as well. LED plotters are generally more expensive to purchase initially, but can make up for that difference with their lower overall cost per page. Inkjet printers cost less to purchase, but can go through ink at a prodigious rate, driving up your cost per page.

Terminology

While it's not technically correct, many buyers use the terms "wide-format printers" and "plotters" interchangeably. Actually, no one makes plotters any more: the term specifically refers to a machine that draws using a pen on a traveling arm. Improvements in inkjet and LED technologies have thankfully made these temperamental, expensive machines obsolete.

Some individual dealers and manufacturers use both terms, typically reserving the term "wide-format printer" for high-end graphics production machines – but in general, the two terms mostly overlap. "Grand format" printers are the extreme end of the spectrum – they print in widths from 5 to 16 feet or more.

Choosing a wide-format printer

The application you have in mind for your wide-format printer will influence your purchase decision in many ways, so make sure you have a clear understanding of both the types of printing you'll be doing and the volume of prints.

The most significant split in the industry is between printers for **graphics** and those for **engineering applications** or computer-aided design (CAD) work. Graphics printers are almost always color inkjets, and emphasize high resolution and the ability to print on multiple types of media. CAD-focused printers are more often monochrome LED printers, and are designed for faster, higher-volume printing.

Be aware that there are a couple of new—and fast—color LED wide-format printers appearing on the market. These new printers have the speed and lower running costs of a monochrome LED printer but provide the color capabilities that today are available only from inkjet printers.

Here's a breakdown of the most common applications of the two types of wide-format printers.

Graphics printers	Engineering printers
Signs	Blueprints
Banners	Floor plans
Posters	Specification documents
Photographs	

Sizing

After the application, size is the next most important consideration. Most wide-format printers can handle widths of 24" to 60", and some go up to 72" or even larger. They print on rolls of paper that can be up to 300' long, or on individually fed sheets of paper. The size of the materials you need to print will help you decide what size printer you need. The standard for engineering applications is 36" plotters, but your needs may vary.

Graphics printer sizing depends more on the type of printing you'll be doing. Grand-format printers, which can range from 60" all the way up to 16' wide, are designed for outdoor banners and large-scale projects.

Print quality

One specification some buyers put too much stock in is resolution. A printer with lower resolution but better technology can sometimes produce better-looking prints than another printer with higher resolution, so seeing sample output is a much better way to judge quality.

Seeing sample output is also an important part of evaluating a wide-format printer. More specifically, get sample output on the exact type of media you intend to use: your brand of blueprint paper, the exact vinyl banner stock you plan to use, or any other specific material that you'll be using. Printer performance can vary dramatically based on the medium being used – in fact, not all models can handle the same types of stock.

Features to consider

Once you have the basics sorted out, there are many additional features you should look for in a wide-format printer. Here's a sampling of some of the most common.

Scanning/copying functionality

A major feature of some wide-format printers is the ability to scan and copy large documents. Some printers may come with this feature built-in; in others, the scanning capability is part of an upgrade module you can purchase separately.

Large-format scanning is a huge plus to AEC users: being able to reproduce full-sized blueprints in-house at any time provides flexibility and reduces the number of trips to the copy shop. For graphics use, large-scale scanning may not be as important.

Adding scanning and copying capabilities will substantially increase your costs – see Pricing for details. If your scanning needs will be few and far between, it may not be worth the extra expense.

Scanning can seem like it might be useful – but for the price tag it carries, make sure it's more than just an occasional task.

Software, drivers, and file formats

To get the best performance from your wide-format printer, you need to ensure that communications between the printer and your software are as direct as possible. There are two aspects to this: the **drivers** the printer offers, and the **printer languages** it supports.

Drivers are small pieces of software that get installed on your computer so it can run the printer accurately. Ask the dealer if the printer has drivers for the specific software applications (e.g., image software, CAD programs) you will be printing from. The answer will almost always be "yes," but you can go one step further and ask if the drivers are certified by the software manufacturer. Certified drivers provide a little extra peace of mind: uncertified drivers will likely work, but you can't be sure without careful testing.

There are dozens of printer languages out there, but a small handful covers most needs. In the graphics market, Postscript and PDF cover almost everything; in the engineering market you may need support for HPGL, HPGL2, TIFF, or potentially Postscript. Make sure the plotter you choose natively supports the languages that your software uses.

Additional features to look for

- A **built-in paper cutter** is a real timesaver, allowing the printer to automatically separate each print as it comes off the roll of paper.
- Support for **multiple paper widths** gives you flexibility – some printers even hold more than one size roll at a time, allowing users to print the size document they need without changing paper or printers.
- **Sorters** and **media bins** let you walk away from big jobs, which can take hours, while the printer separates and organizes the output.
- Built-in **accounting** features are useful in situations where prints will be billed to different projects or clients.
- Support for **varied types of ink** allows you to choose the right ink for the media you're printing on – especially important for printing on vinyl or other less-absorbent materials.
- **Modular or reduced footprint** plotters are great for use in construction trailers and other job sites where wide-format technical documents are used but where space is limited.

Tip: Color processing

Trying to match existing colors exactly is a complicated process: it's fairly easy to get close, but the interaction of different inks and the material you're printing on makes exact matches difficult. For very precise color work, you may want to invest in a Raster Image Processor (RIP).

RIPs provide the highly accurate color management that's essential for prepress work. However, they're not needed

for engineering work, nor are they required for many types of graphics printing. They can also add several thousand dollars to your purchase price, so don't feel pressured to add one if precise colors aren't critical to your needs.

Choosing a dealer



The dealer you choose can have a big impact on your overall satisfaction with your wide-format printer: service and support are the most important considerations. Whether you need a service technician to come out and repair a mechanical problem, or just have a question you need answered, the support offered by your dealership is critical.

Evaluating support can be difficult, but there are a few important steps you can take. When you visit the dealership, ask to tour the service department to get a sense for the size of their operation. Find out what avenues of support they offer: telephone or email-based help, online knowledgebases, discussion forums, etc. Also, inquire about their hours if you anticipate late-night printing sessions.

Also consider checking references. Any reputable printer dealer should provide you with references to customers who purchased the exact model of printer you're considering. Ask them how responsive the dealer has been to service calls and how comfortable they feel about the technicians' level of expertise. If the printer has had any problems, find out how these problems were resolved. Of course, the dealer will

connect you with their most satisfied customers, but you can still gather useful information this way.

Other dealer considerations

Many large-format printer dealers carry lines from multiple manufacturers, allowing you to compare print quality from different brands for yourself. Getting sample output is essential – but some dealers even go further and will provide an on-site trial, allowing you to test the printer in your environment. If you can't get an on-site trial, a demonstration in the dealer's showroom can also provide useful information.

While size isn't necessarily the best indication of dealer quality, longevity may be. Small companies that have been around for a long time should be just as dependable as larger companies. Smaller dealers may offer a more personal touch, while larger dealers may have more of a selection, but these differences aren't critical.

You should look for a dealership that does a steady business in wide-format printers. Many dealers that focus on copiers, scanners, and standard-sized printers also carry a small selection of wide-format printers. Understandably, these dealers' expertise tends to center on the types of equipment they sell most often. You're better off with a dealer who's very familiar with wide-format printers.

Pricing and maintenance

Pricing for wide-format printers and plotters can span a huge range, but continues to fall every year. The biggest variables are size and quality: you'll see bigger price tags for more accurate color reproduction and higher resolution.

Low-end wide-format printers, usually 24" inkjets, range from **\$1,300 to \$4,000**. Most businesses investing in LED or inkjet plotters can expect to pay **\$6,000 to \$15,000** for a full-featured printer that produces professional results. Color inkjets for commercial use can run **\$15,000 and more**. The newer color LED plotters can total **\$30,000 and up**.

Production-class printers get even more expensive, reaching **\$50,000 to \$250,000** and more. These machines are designed for much higher volumes of printing: hundreds of thousands of square feet per month, with speeds to

match. These pricey machines are only needed by specialized print shops or the largest CAD shops.

Adding scanning/copying functionality to a wide-format printer can almost double the price, in some cases. \$6,000 to \$15,000 printers jump to **\$15,000 to \$30,000** with scanning add-ons.

At these prices, you may be tempted to look at used wide-format printers, and in some cases you can get a good deal on a reliable LED printer. Inkjets' operational lives are generally fairly short – they get outdated by improving technology within 3 to 5 years – so it's usually not worth buying used inkjets. If you do buy used equipment, be sure to carefully evaluate the warranty and service plan options available.

Check costs for consumables

Remember that the initial purchase price is only part of the total expense of a printer: consumables, most significantly ink or toner, will be a part of your budget for years to come. Per-page costs are always higher with inkjets than LEDs: toner cartridges provide much more coverage than ink refills. Paper and other media costs are usually comparable across different plotter models, but should also be considered in your budget.

Ask your dealer for cost estimates, preferably per page or square foot. Then try to verify those costs elsewhere – for example, by asking the customer references they gave you. And don't hesitate to look for third-party sources for ink and toner: while you should always turn to the dealer for service and repairs, you can often get better deals on basic supplies from other sources.

Maintenance and service agreements

Like copiers, LED printers require regular maintenance: cleaning, inspection, and replacing worn parts. Keeping your printer well-maintained is the best way to prolong its useful life and make sure that it runs smoothly between cleanings. A maintenance agreement will usually cover toner, drums, and all other replaceable parts, as well as regular visits to your office by a technician.

Inkjet printers don't have as many service requirements. You can purchase a warranty that covers all major parts, but you'll be responsible for buying ink refills and print heads, the two most common inkjet needs.

For both LED and inkjet printers, you'll need to download periodic software upgrades, as well.

Maintenance agreements can be priced per square foot printed per month, or simply at a fixed rate per year. If you're new to wide-format printing, or if you'll depend on the printer for day-to-day production, we strongly recommend that you purchase the maintenance agreement.

Make sure the agreement covers on-site labor, and see if guaranteed response times are included. Parts, if needed, should be guaranteed for next-day delivery.