

# Toner vs Ink Jet Guide

How to Determine the Best Wide-Format Printing Technology for Your Company

Free Guide  
White Paper



**TAVCO**

# Wide-format printing is changing



## Introduction

If you work in **AEC - architecture, engineering, or construction**, then you know the way you handle construction drawings has changed significantly over the years.

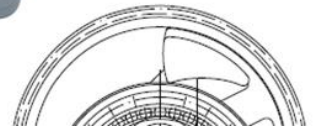
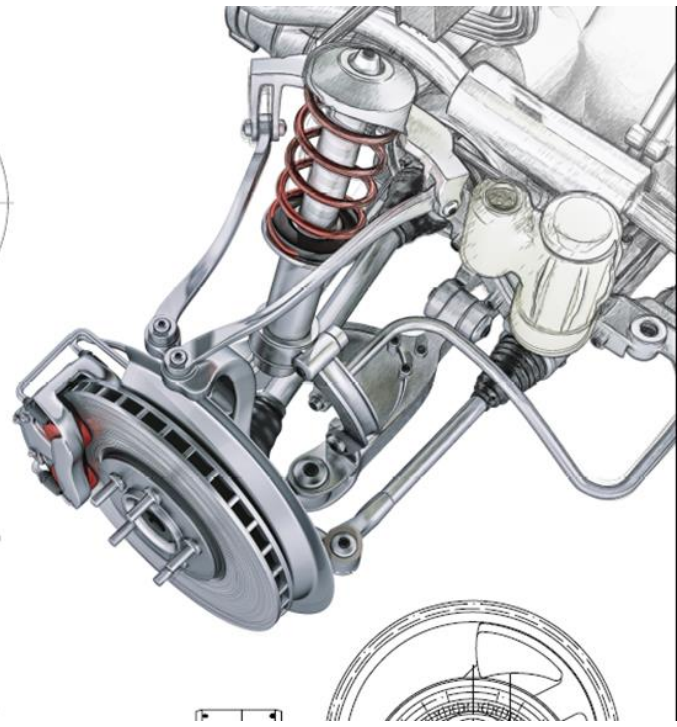
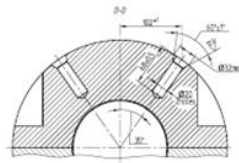
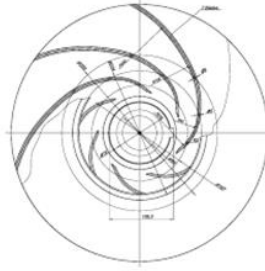
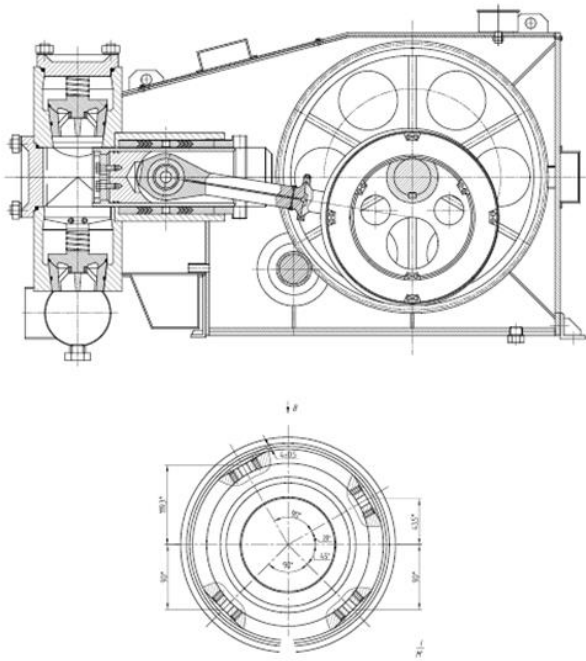
In the past, plans were printed and distributed by print shops to subcontractors for bid sets. Now, more and more, plans are shared as electronic files through email or online plan rooms. And, another aspect that has changed, is the increasing integration of color information into construction documents.

Therefore, subcontractors need an efficient way to print their plans for themselves instead of relying on outside resources.

From here, AEC oriented companies typically begin their search for a new wide-format system. *So, which technology makes the most sense, ink jet or toner?*

This guide will analyze some data to determine which printing technology provides the most cost-effective solution to meet your needs. But, be advised, just because a technology shows a lower cost of operation, does not mean that it is the best fit for your company's needs and demands. Other factors should be considered as well, such as size, ease-of-use, and office friendliness.

It is important to note that many of the wide-format systems available today are multifunction systems—printers bundled with onboard scanners. This article has been updated to reflect that change. This allows for a fair comparison between the two types of printing technologies that are the most sought after and used in AEC today.



Before you can effectively determine what type of plotter would suit you best, you need to analyze all your wide format requirements.

## Invest in the Right Technology for the Job

Too often, buyers only have one criterion—to buy the least expensive plotter available. While this position is certainly understandable, it doesn't mean that it is the best business decision.

The truth is, sometimes when you purchase a plotter based on the lowest price, it can ultimately cost you more in the long run. Printers, small format and large format alike, are designed to function within a certain volume parameter. Once you exceed the limits of that parameter, the maintenance and usage costs will exceed the expense of a bigger system. Therefore, careful analysis of your company's estimated print volume is crucial. If you expect to have mid-to-high volume needs, choosing the correct technology for the application is mandatory.

Durability is another factor to consider. Regardless of manufacturer, ink jet plotters are generally designed for a three-year duty cycle.

Toner-systems and the newer single-pass ink jet units, on the other hand, are expected to last for many years. In fact, Océ systems tend to perform reliably for seven to ten years, typically. A solid platform like that could easily outlive two or three ink jet units. Plus, toner systems are much more capable of handling higher volumes and have faster outputs than their ink jet counterparts. There are instances where toner-based systems are used to print as much as 50,000 square feet per month.

# True Costs of Wide-Format Printing

**Traditional Ink Jet Plotters**—the least expensive option regarding the initial hardware price, but they are dependent on ink and other consumables, such as print heads and maintenance kits (cleaners). These supplies tend to be expensive for higher-volume environments. Ink jets are also constructed mostly of plastic, so they are not as durable as toner-based machines that are typically constructed of metal.

Also, all ink jet plotters manufactured today are full color machines, so the ink costs of a full ink set is a factor. So, if your needs are only monochrome, you will have no choice but to work with a full-color machine in order to print black line sheets.

It is important to note that these dynamics are applicable to all ink jet products, such as the Canon imagePROGRAF series as sold by TAVCO as well as other brands.

**If you consider all the usage elements (paper, ink, and print heads), the resulting cost for monochrome ink jet printing averages \$0.203 per square foot at 3,000 square feet per month.**

**Expect this price to increase significantly for color output.**

**This is the figure that we will use in our comparison charts.**

**How the \$0.203 cost per square foot was calculated:**

- \$0.033—Cost of ink per square foot
- \$0.034—Cost of 20-pound ink jet paper per square foot
- \$0.013—Cost of ink jet print head per square foot
- \$0.002—Cost of maintenance cassette per square foot
- \$0.082—Cost of onsite parts & labor service and support (Contract)
- **\$0.203—Total cost per square foot**



**LED Toner Plotters**—these units are more expensive than ink jets regarding the initial hardware price, but under the right conditions, they can easily justify the difference through speed and productivity. Again, this is a baseline cost for units utilizing this type of technology, such as Océ Wide-Format Printing Systems.



If you consider all the usage elements (paper, toner, developer, and service), the resulting cost for **monochrome toner printing averages \$0.116 per square foot at 3,000 square feet per month.**

**How the \$0.116 cost per square foot was calculated:**

- Based on TAVCO’s proprietary all-inclusive service plan, the total cost of operation is calculated at \$0.116 per square foot at 3,000 feet per month.
- Interestingly, if the monthly volume doubles, the cost per foot drops as volume increases. For instance, at 6,000 square feet per month the cost drops to \$0.10 per square foot.
- And, at 10,000 square feet per month, the operational cost is \$0.095 per square foot.

# Toner vs Ink Jet Cost Comparison

This wide-format analysis is based on the comparison of a [Canon iPF785 MFP](#) and an [Océ PlotWave 345 MFP](#). Both of which are configured as two roll systems complete with scanner and system controller.

*Both units are sold and supported by TAVCO Services, Inc.*

## The Long Term (5 years)

This scenario explores the total cost of operation over a long-term, 5-year period. Although inkjet printers are typically rated for a 3-4 year life, some users will tend to keep the units longer. Given that, this is how the two technologies compare after 5 years of ownership.

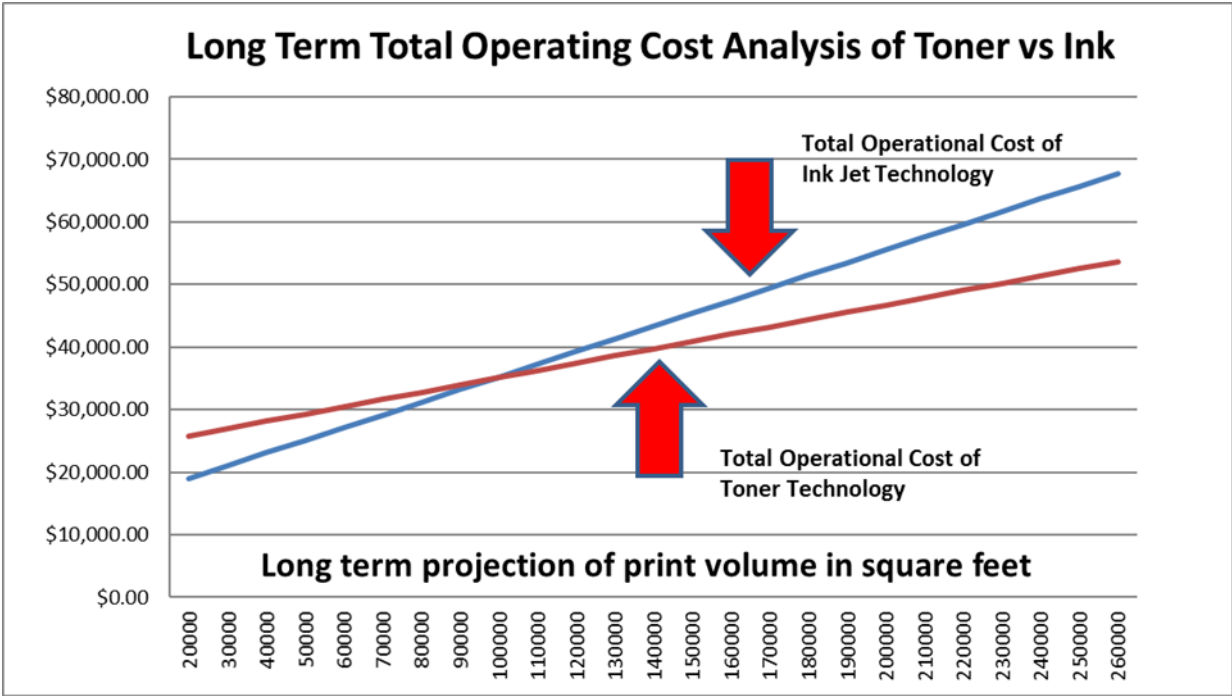
Inkjet Technology		Toner LED Technology	
<b>Hardware costs to acquire equipment</b>			
Cost of MFP (printer and scanner)	\$8,995.00	Cost of MFP (printer and scanner)	\$14,500.00
<b>Usage costs - paper and other consumables</b>			
Printing costs per square foot	\$0.203	Printing cost per square foot	\$0.116
<i>*average costs for service, ink, &amp; paper via TAVCO PP PLUS</i>		<i>*average costs for service, toner, &amp; paper via TAVCO All-in-One Plan</i>	
<b>Total costs of operation - includes equipment and supplies</b>			
Total print cost per month	\$609.00	Total print cost per month	\$348.00
Total operational print cost per year	\$7,308.00	Total operational print cost per year	\$4,176.00
<b>Total cost of ownership over 5 years</b>	<b>\$45,535.00</b>	<b>Total cost of ownership over 5 years</b>	<b>\$35,380.00</b>

*This is a true "apples to apples" cost comparison between ink jet and toner based printing technologies. For this comparison, a Canon iPF MFP System is set against an Océ Plotwave 345. Both are configured as a 2-roll MFP with printer, scanner, and system controller. The print demand is based on an average baseline of 25 plots per day (3,000 square feet per month). The price level used for both units is an estimated "street price". Actual Price will vary, however, the differences between the two should remain consistent with this comparison.*

**Results:** Although the initial cost of the toner machine is higher, the ink jet cost much more to operate. Another important thing to point out is that, as the print volume increases, the square foot cost of operation of the toner system decreases. Typically, toner-type plotters will experience monthly demands over 5,000 square feet per month. This will certainly lend favor to the toner technology.

With current ink jet technologies, two D-size pages per minute is the most to expect from any ink jet plotter. On the other hand, certain toner units can delivery over ten pages a minute. This equates to a 400% speed increase.

# Analysis – Long Term Toner vs Ink Jet



***\*The X-Axis of the scale reflects the total number of square feet printed over the lifetime of the product.***

## Findings

After reviewing the total operating costs between the two printing technologies, it is evident that the toner plotter ultimately cost less over the lifetime of the printer. According to the chart, at 100,000 square feet, the toner plotter achieves its return on investment (ROI) over the ink jet system. If you consider a typical monthly print volume of 3,000 square feet per month, the toner system’s ROI happens in 33 months.

## Plotting in Color – A Growing Need

Traditionally, CAD and construction drawings have been sparse, 2D monochrome images that cover approximately 5% of the page. If your company still relies on those types of drawings, then a monochrome printer may work just fine for you.

However, advancements in technology are redefining the way firms approach the design-build process. BIM workflows through Revit and Navisworks is changing the way people work in AEC. With BIM, the entire project can be built virtually from beginning to end.

With all this new data injected into the workflow, color printing is becoming vital for better communication. So, if you use BIM in your workflows, a color plotter would be a good asset for printing color data.

# New Single Pass Ink Jet Technologies



Over the past couple of years, significant advancements propelled a new ink jet technology onto the scene. Single pass ink jet technology is known by a couple of names, [Memjet](#) and [HP PageWide](#), but, the concept is the same.

Unlike traditional ink jet machines, that use a reciprocating print head, single pass machines utilize a stationary print head that jet droplets of ink onto a traveling print media. Memjet refers to this as “Waterfall Technology.”

Single pass technology is certainly impressive to watch since it is capable of printing at blistering speeds—up to 16 D-size sheets per minute. Another attribute to this type of printing is a lower operating cost than traditional ink jet or toner systems, but there are some limitations to keep in mind.

## Limitations Single Pass ink jet Systems

- **They are large** – Most high-speed ink jet systems are designed to be commercial printers and are not good fit for traditional office environments. Likewise, their excessive mass can make them difficult to install, particularly when it comes to navigating doors, tight turns, and standard elevators.
- **They are heavy** – Generally, single pass printers weigh more than 1,000 pounds. This can be challenging for office environment that do not have concrete or reinforced floors.
- **Speed may not be necessary** – Most AEC offices today average 3,500 square feet per month of printing demand. Overall, this number has come down over the years as companies digitize some of their workflow and utilize their large format printers for more color-centric duties. This lower monthly demand negates the need to print plans faster.
- **Ink jet Process** – Despite the fast output, the drawings are subject to the standard limitations and weaknesses of ink jet prints—drying time might be an issue when larger color areas or full-color sheets are produced.



# Color Toner Wide-Format Systems



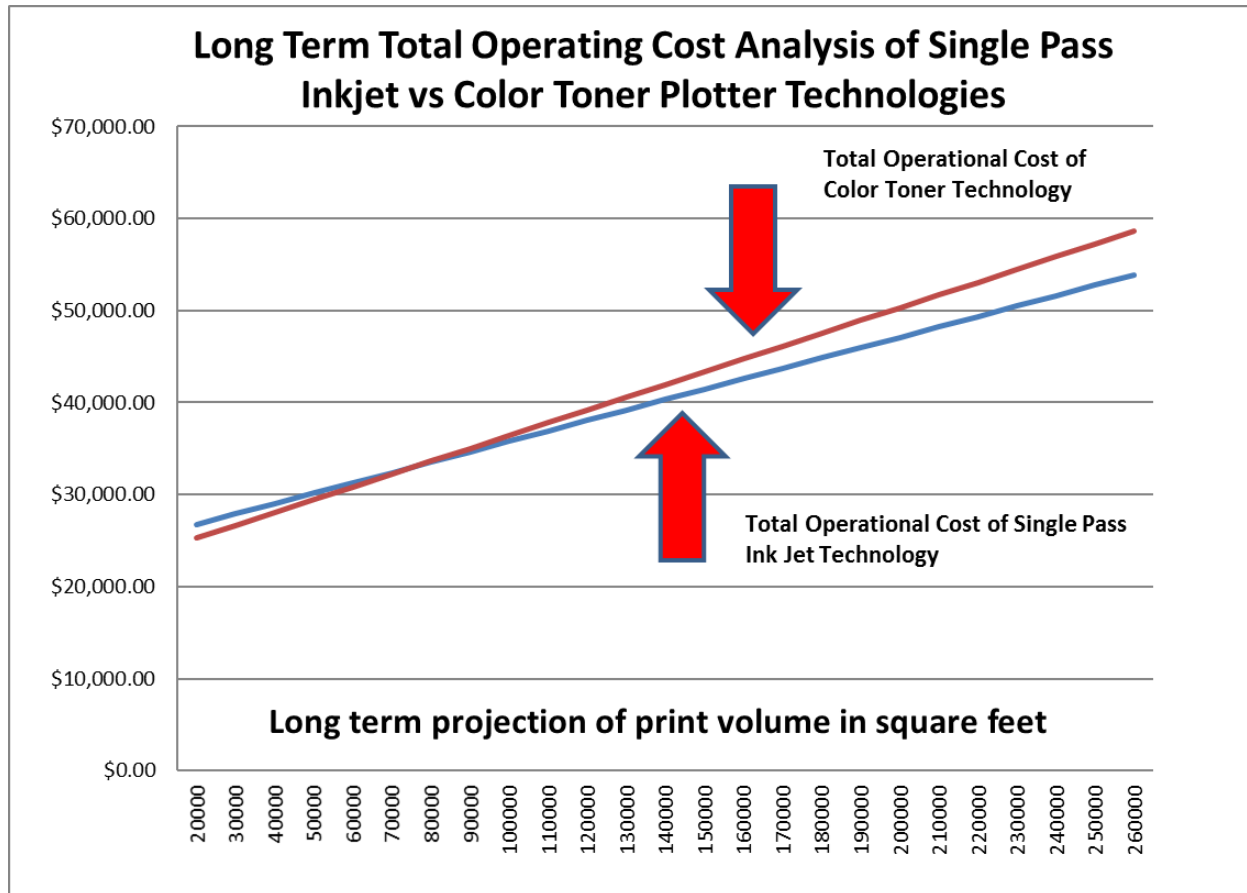
In addition to single pass inkjets, full-color toner plotters are another option when heavy duty color printing is needed. Both, [Kip America](#) and [Canon Solutions America](#) offer solutions into this segment, but they are drastically different from one another.

Kip's 800 Series are designed similarly to standard color laser printers. They utilize a dry-toner xerographic process, using a standard drum and fusion method.

Canon Solutions America offers the innovative ColorWave system that uses a patented process called [CrystalPoint technology](#). This method utilizes solid Toner Pearls that get melted into a gelled state and then jetted on the media like an inkjet printer. The difference is, however, that this toner instantly crystallizes on the surface of the media, rather than soaking into the media like inkjet (both traditional and highspeed).

Single Pass Inkjet Technology		Color Toner Technology	
<b>Hardware costs to acquire equipment</b>			
Cost of MFP (printer and scanner)	\$24,900.00	Cost of MFP (printer and scanner)	\$22,500.00
<b>Usage costs - paper and other consumables</b>			
Printing costs per square foot	\$0.113	Printing cost per square foot	\$0.139
<i>*average costs for service, ink &amp; paper typical HP PageWide</i>		<i>*average costs for service, toner, &amp; paper via TAVCO All-in-One Plan</i>	
<b>Total costs of operation - includes equipment and supplies</b>			
Total print cost per month	\$339.00	Total print cost per month	\$417.00
Total operational print cost per year	\$4,068.00	Total operational print cost per year	\$5,004.00
<b>Total cost of ownership over 6 years</b>	<b>\$49,308.00</b>	<b>Total cost of ownership over 6 years</b>	<b>\$52,524.00</b>
<i>This is a comparison between single pass inkjet and color toner based printing technologies. For this comparison, a HP PageWide printer is set against an Océ ColorWave 500. Both are configured as a 2-roll MFP with printer, scanner, and system controller. The print demand is based on an average baseline of 25 plots per day (5,000 square feet per month) of basic, color line drawings. It should be noted that printing area fills or full color will change the metrics. The price level used for both units is an estimated "street price". Actual Price will vary, however, the differences between the two should remain consistent with this comparison.</i>			

# Color Toner vs Single Pass Comparison



***\*The X-Axis of the scale reflects the total number of square feet printed over the lifetime of the product.***

## Findings

After reviewing the total operating costs between the two printing technologies, it is evident that the single-pass inkjet ultimately cost less over the lifetime of the printer, albeit marginally. According to the chart, at 80,000 square feet, the overall cost of both systems is equal. But, considering the special requirements mandated for a high-speed single pass inkjet, the nominal difference could easily justify the decision to get a color toner unit.



# Summary



The analytics show that it is crucial to do the proper planning and to accurately forecast your print volume needs. Simply looking for the least expensive solution can sometimes leave you paying more in the end—much more! Here are some key takeaways:

- **Operating costs for ink jet plotters average \$0.203 per square foot (2D CAD line prints) but these units are slower and are consumable intensive.**
- **Operating costs for LED toner plotters average \$0.116 per square foot at lower volumes, but drop to around \$0.10 at mid-volume levels.**
- **Color toner plotters cost about \$0.139 per square to operate, but they are incredibly powerful systems that can replace the workload of multiple ink jets**
- **High-speed, single pass inkjets cost about \$0.113 per square foot to operate, but have some considerable limitations regarding installation environments. They are large, heavy, commercial machines not generally suited for standard office environments.**
- **Ink jet plotters and MFPs are a great choice for entry level systems.**
- **Toner plotters and single pass inkjets are much more durable than traditional ink jets and can yield a much great ROI over the lifetime of the product.**

**For more information on wide-format technology solutions,**

**[Contact a TAVCO Wide-Format Advisor](#)**

**[Information on Océ Wide Format Systems](#)**

**[Information on Canon iPF Color Ink Jet Plotters and MFPs](#)**

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