

Bulk Ink Replacement Systems

A personal look at the pros and cons of bulk feed systems

BY DAVID KING



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REPLACING YOUR PRINTER’S cartridge-based ink system with a bulk feed system might seem like a no-brainer; but before you get all excited about lowering your ink costs, you’ll want to take a look at plusses and negatives, and examine the return on investment (ROI).

First, let’s define what we mean when we say “bulk ink systems.” A bulk ink system consists of a large reservoir or tank that is connected to a hose that is connected to a printhead, which can then run continuously. In most bulk ink

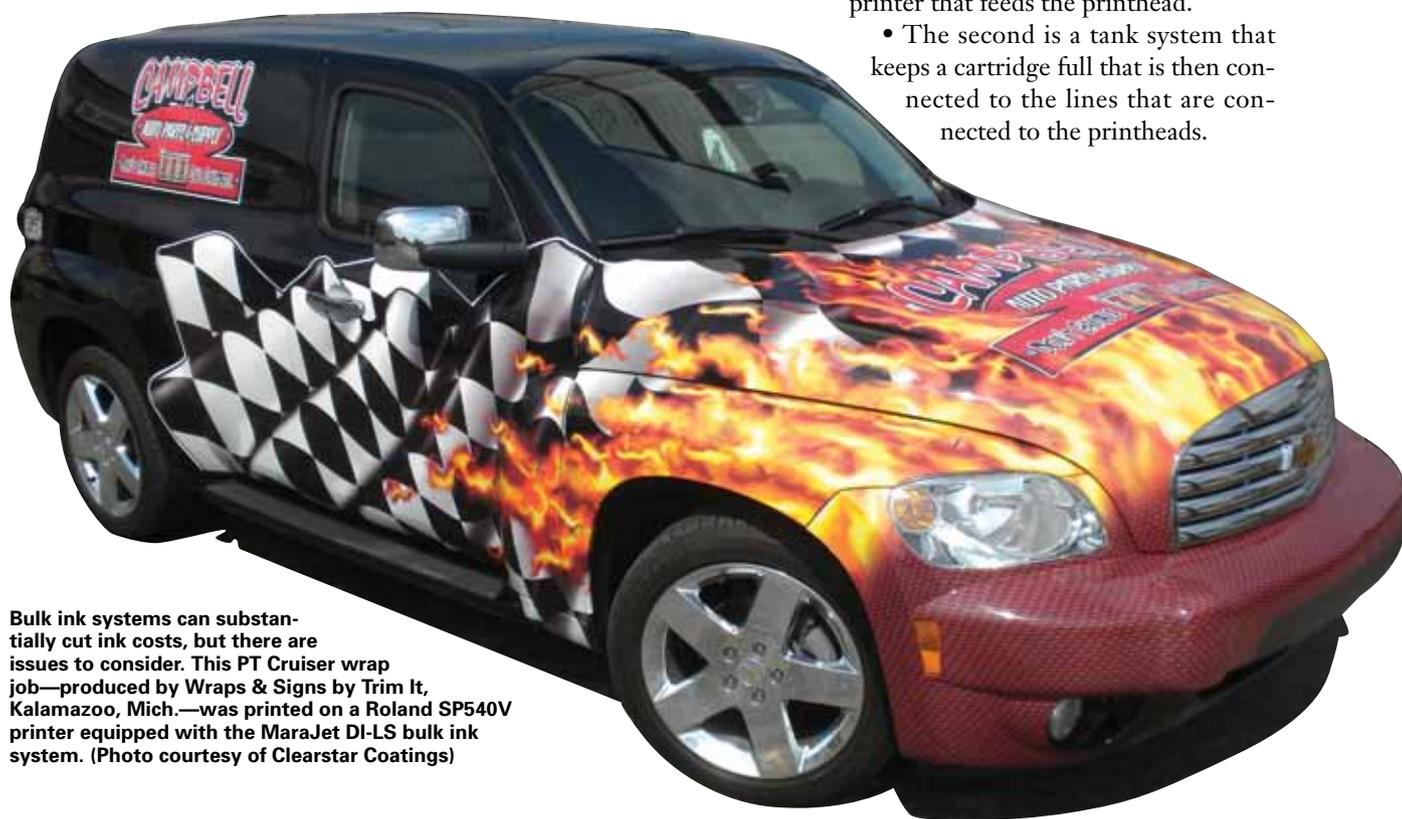
systems, no seal bag or disposable cartridge is used.

Today most large, expensive printers come equipped with a bulk feed system. Some are proprietary and require you to use their inks, while others are simply a tank with a hose to the printhead; and you can use just about anyone’s ink in the system (provided it is compatible with the printer). I have been using bulk feed or bulk ink systems for more than 11 years. So what have I learned? Let’s just say, I’ve learned a *lot*.

SYSTEM TYPES

Any bulk feed system requires a separate tank for each color, though some have a tank dedicated to each printhead, so you could have multiple tanks for the same ink color. There are two types of bulk ink systems.

- The first is a tank system that is directly connected to the feed lines of the printer that feeds the printhead.
- The second is a tank system that keeps a cartridge full that is then connected to the lines that are connected to the printheads.



Bulk ink systems can substantially cut ink costs, but there are issues to consider. This PT Cruiser wrap job—produced by Wraps & Signs by Trim It, Kalamazoo, Mich.—was printed on a Roland SP540V printer equipped with the MaraJet DI-LS bulk ink system. (Photo courtesy of Clearstar Coatings)

One of the issues to consider is the way in which the printer currently handles the ink flow. Most small/mid-size printers (Mimaki, Mutoh, Roland, etc.) use gravity to move the ink from the cartridge/tank to the printheads. Others, like Epson for example, use an air pressure system to force the ink to the printheads.

The bulk ink system seen in the images in this article is a gravity feed type, and this type is the most popular system. What needs to be closely considered is the way to successfully get the ink to the printhead without causing the printhead to overflow, or starve. One older bulk ink system I recall had the tanks on a stand and you would lower or raise the tanks depending on the gravity needed.

The system I currently have has a standard 440 ml cartridge that fits into the printer just like the cartridges you use now. The bulk ink cartridge has a float inside, similar to a toilet tank float. It connects to the hose that is connected to the ink tank on top of the printer. The float in the cartridge allows more ink in when the ink level goes down. On the top of the cartridge is a plastic screw that you can turn to raise or lower the ink level in the cartridge. These cartridges are very nice; and the float system inside works great.

THE CARTRIDGES

The next issue that you will encounter with bulk ink systems is the reset system. Each printer cartridge that you purchase today has a chip on it that knows the expiration date of the ink, the level of the ink in the sealed bag that is in the cartridge, and when the printer the bag/cartridge is empty—or what they *call* empty.

Once the printer is told the bag is empty, the printer knows not to use or accept this cartridge anymore. The bulk ink replacement system manufactures had to design an electronic device that would trick the printers into seeing a



Ink replacement systems are available in cartridge form, or in bulk ink feed systems.



Here is a close-up of the reset buttons. One is required for each ink channel.

new cartridge without actually replacing it. The system I am using has a push button circuit board on the back of the cartridge that uses a small battery to send a signal to the printer telling it that this is a new cartridge.

Not all printers can accept bulk ink systems without the counter in the printer thinking the ink cartridge is empty. This might require you to use the reset button a lot. Here are the six steps I must take in order to reset the cartridge:

1) With the printer off (or in sleep mode) I pull the first cartridge out just enough to disengage it from the printer (about an inch).

2) Next I push the reset button once, and wait five seconds.

3) Now I push it again, and wait an additional five seconds.

4) Next I plug the cartridge back into the printer.

5) Okay, now I repeat steps 1-4 for each cartridge in the printer.

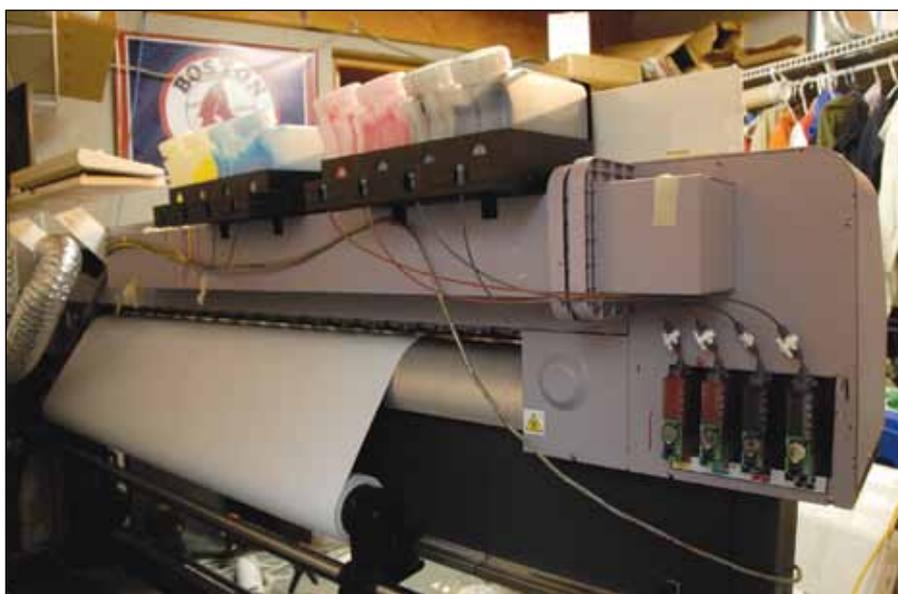
6) Finally, I power up the printer and check its control panel for my new ink levels. If all the levels are at max, I'm ready to print. If not, then I'll need to repeat the procedure for any cartridge that is not registering as full.

THE TANKS

This system looks pretty straight forward and easy, but there are some things I don't like at all. The first answer is no filter! Believe it or not, you can open

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Here you see a liter of Triangle inks sitting atop the fill tanks. When refilling the tanks it's important to keep debris from entering the system.



My bulk ink replacement system seen from the rear of the printer. This system is a gravity feed type.

the tank top and drop in anything you want, dust, dirt, hair and nothing stops this from making it into the ink lines. I consider this a basic design flaw.

The second issue I have is ink flow when you have dual tanks with the same ink in them. Printers all have different configurations that give different results in print quality and speed. I run my Mimaki JV3-160 at 360 x 540 resolution in 2 x CMYK mode for all my print jobs and the print quality is stunning. However, with this configuration I get six inches per minute printing—so I can print a vehicle wrap for a full size van in two hours, but with this mode I am only using one set of the print printheads. So now I have a bulk ink system that does

not use one of the two ink tanks.

This situation can lead to drying ink in the lines, and ink going bad in the second tank. Plus the cost of the extra tanks is silly when for about \$1 they could have put in a “Y” valve to both yellow cartridges to fill.

To correct this issue with the one set of printheads not being used, I am currently in the process of switching my printer over to 720 x 720 mode and I have found I get .5" more in speed and the quality is even better. But now I must recalibrate all my media again.

My only major issue to this point is ink clogging and the problems have always been at the needle that plugs into the cartridge. This is a real issue to fix,

and caused me a few headaches, but the system works great and I am saving a lot of money.

COST AND ROI

This would not be a Dave King article without looking at ROI. The bulk ink system I purchased was recommended for use with eco-solvent and mild-solvent inks, but not with hot solvent systems. I purchased the system knowing I was on my own for support, and I was fine with this.

The price of bulk ink systems range from \$450 to \$900, depending on the number of tanks and cartridges you need and the printer you will be connecting it to. For example, if you have a printer that runs CMYK, Lc, Lm, you would need six ink tanks and cartridges.

My system cost \$795, and I feel it was worth it. Here is how I justify my bulk ink system:

- With the printer manufactures cartridges, I got tired of always finding ink left in the bag after the system said “cartridge empty.” The system would never let me use all the ink—there was always 10 percent or more ink left in the bag. At \$110 per cartridge, this is an additional \$11 in ink for each cartridge. On average I went through four cartridges a week—that’s \$2,288 per year in wasted ink!

- I was taking out cartridges that were not empty (typically around 30 percent), and putting in new ones in order to be able to print through the night on long jobs. Many frustrating mornings I would come in only to find that the printer had stopped during the night because I ran out of ink in one cartridge.

- On heavy coverage jobs, I sometimes found that even a full cartridge would not run all night. I calculated that over the course of a year I lost more than 100 hours of finishing productivity because the printer stopped at night, causing me to delay my morning finishing. My cost for this was about \$2,300.

- Then there is the fact that for a long time I could not find a company that would recycle the printer manufactures’ ink cartridges. Commercial recycling

companies would not take them, so I ended up throwing away many cartridges each year. Not cool for a guy who is a big supporter of recycling. Today, the bottles I get my ink in are recyclable. And you should know that today some printer manufacturers, such as Roland, now offer cartridge recycling.

- And finally the cost of the ink itself. Replacement inks tend to be much cheaper than OEM inks. So you have a point of reference, I started with the manufactures 440 ml cartridges that cost me \$110 each. Then when I wanted to save money, I moved over to Eleven Ten inks for \$68 for the 440 ml cartridge. Later, I found a bulk ink system I liked, so I purchased it. Based on one liter of ink covering 750

sq. ft., the follow savings can be had with a bulk ink system (your savings might vary, but this will give you an idea). I get my numbers by using the following formula: I take the ink cost per square foot, then multiply this cost difference by 400 square feet (a typical ink usage per one roll of vinyl) and then multiply that by 52 weeks. Example: $\$.33 - \$.16 = \$.17 \times 400 = \$68 \times 52 \text{ weeks} = \$3,536$.

OEM inks (440 ml cartridges), market price \$110 ea. (\$.33 per sq. ft.). This ink costs me about \$68 for every 675 square foot roll of vinyl I use; or \$3,536 per year (at 1 roll/week)

Replacement inks (440 ml cartridges), market price \$68 ea. (\$.21 per sq. ft.) This ink costs me about \$20 for every 675

square foot roll of vinyl I use; or \$1,040 per year (at 1 roll/week)

Bulk ink system (1 liter bottles), market price \$119 per liter (\$.16 per sq. ft.)

When you add in the cost savings—for the ink, the extra ink left in the cartridges that the printer will not let you use, for the ink you can't use due to a cartridge being too low for an overnight job—the savings are quite substantial.

Still, I hope the manufactures of bulk ink systems are reading this, because we need to see better bulk systems in the future. I hope this helps you put more money on your bottom line. Good luck! Be smart with your money, and I will see you on the show floor! **SDG**