3M Science.
Applied to Life.™

A Guide to Digital Printing

Introduction

The printer used in your shop is more than just a machine – it's the powerhouse that helps you achieve flawless work. Your printer can command the speed, volume and final quality of projects you take on. **Because it's such a critical component, you need the confidence that you're making a wise investment when selecting a printer.** With no lack of options to choose from, each type of printer has different merits that can make it the best option for your business. Some common factors that guide people when deciding on a printer include: the amount of money they want to spend, the amount of printing they will need to do, the kinds of applications they'll most often tackle and whether they will be using roll stock, rigid stock or both. This article was crafted to help you navigate the world of digital printing and the many variables that affect the way your printer performs, including how different inks print and how the media reacts to the printing method. You will also find tips for how to setup, maintain and select media for your printer.

In this guide we cover:

- Inks Overview
- Printing Setup and Equipment
- Hiring the Right People
- Printer Maintenance and Managing Projects
- Warranties

Inks Overview

A key driver in printer selection is the kind of ink it uses. There are three main, distinct ink categories:

- ▸ *Latex*
- ▸ *Solvent/Eco-Solvent*
- ▸ *UV*

Whether your primary focus is wraps, fleet graphics, illuminated signs or interior/wall graphics, it is important to understand which ink is best suited for the job.
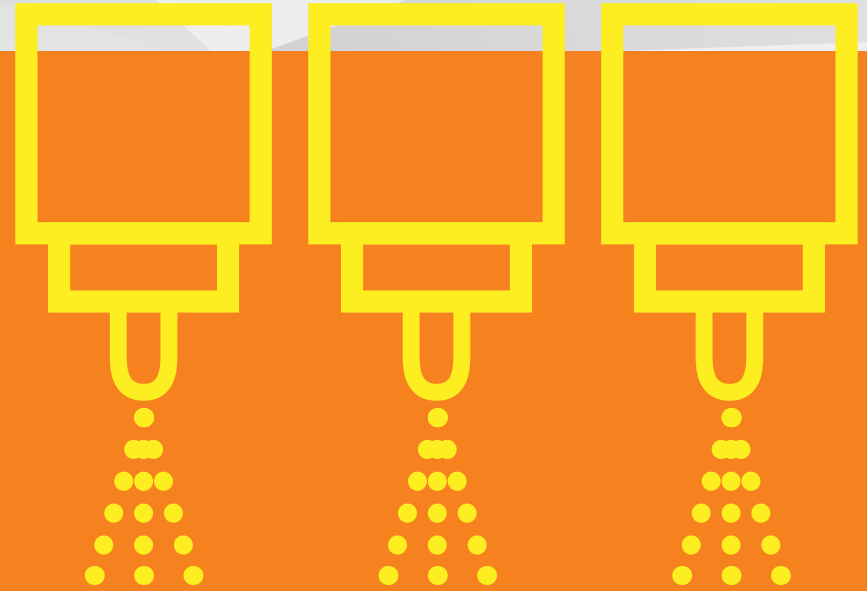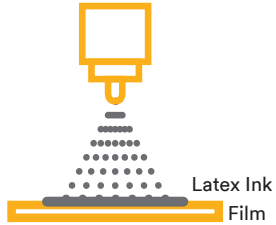
Latex Inks

Latex technology is the newest addition to the industry. It is rapidly growing in popularity because of its flexibility and versatility. Latex is a water-based ink, so it does not require extra ventilation and is better for the environment.

Latex printers are quite popular for both outdoor and indoor applications, including vehicles, fleet, POP, banners and more. The conformability of latex allows it to be stretched around tight contours and curves.

Latex inks are fully cured as they leave the printer, so there is no need to out-gas before laminating.

One thing to keep in mind: latex printers require higher heat to dry to cure the ink to media, resulting in higher energy consumption compared to other inkjet technologies.

Latex Ink
Film

3M™ MCS™ Warranty– Latex Inks

Solvent Inks

Solvent printers typically offer a wider color gamut than latex. Solvent and Eco-solvent refer to the same type of ink, but eco-solvent inks are composed of materials that contain lower volatile organic compound (VOC) content than regular solvent inks. Solvent carries the pigment onto the vinyl surface, allowing the solvent to evaporate or "flash off". This leaves behind the pigment, which ultimately creates the image.

Common applications for solvent inks include vehicle graphics, POP, walls and windows. Overall, it's a very flexible option and ideal for applications on a wide range of substrates.

Solvent inks need a 24-hour period or more for outgassing before lamination in a well-ventilated area. This is a factor to consider when estimating the timing of job completion.

Solvent Ink
Film

Eco-solvent Ink
Film

3M™ MCS™ Warranty– Solvent Inks
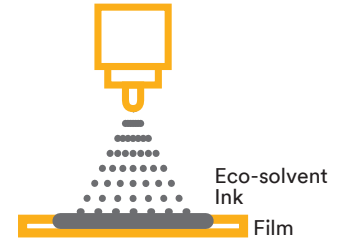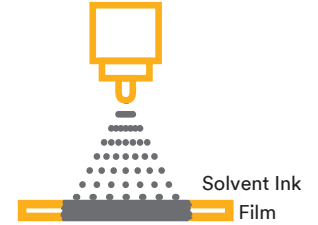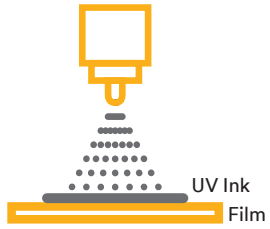
UV-Curable Inks

As the name would indicate, this ink requires a UV light (mercury halide or LED) in order to cure. The ink sits on top of the film, and each pass of the print head creates and cures a new layer of ink.

UV ink can be printed up to five meters wide and instantly cures, which is why it's popular for more industrial applications and high-output shops. In general, UV ink is well-suited for direct to rigid surface applications, such as large fleets, windows, direct to print POP, partial vehicle wraps, and more. Historically, UV inks are not very flexible, and, as such, haven't been used with materials that will stretch. However, 3M has formulated new 3M™ Superflex UV Inks for EFI which offer enhanced stretch and flexibility, outstanding weather-resistance and durability, and can be used for full vehicle wraps.

The shelf life of UV-curable inks is shorter than other kinds of inks, so keep an eye on their expiration dates. The inks should be stored in a climate-controlled room where there is little temperature variation.

UV is a sustainable ink option, and its absence of volatile organic compounds (VOCs) makes it an even more environmentally- friendly option than eco-solvent.

3M™ MCS™ Warranty– UV Inks

Printing Setup and Equipment

There are many factors that must be considered when developing large-format graphics. Humidity, temperature and cleanliness are all factors that affect the quality of the printed graphic. The correct conditions, along with the right tools, can help ensure optimal graphics production.
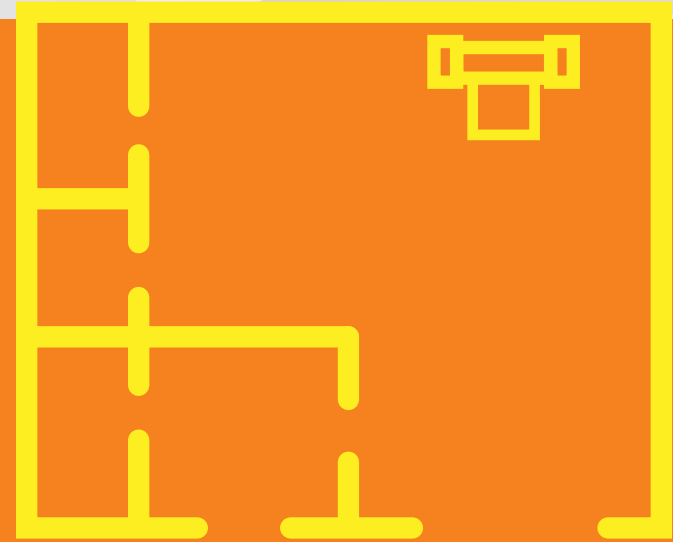
Print Shop Environment

Ideally, a print room should be a separate and enclosed area for the printer and media, as this makes it easier to keep your equipment free of dust and dirt throughout the entire printing process. Ensure that the print room stays clean, is properly ventilated and maintains a firmly controlled temperature (70 to 75 degrees Fahrenheit) and humidity (50-72 percent).

Recommended print room temperature

70–75°F

Recommending print room humidity

50–72%

Non-carpeted floors are best for keeping static to a minimum. Before printing, all rolls of media that will be used should be stored in the climate-controlled print room for 24–48 hours, in order to acclimate.

To prevent oil and dirt on your hands from damaging the media, gloves must be worn when handling it.

The drying, lamination and trimming area should consist of large, glass-topped tables on which to proof and trim the graphic. For graphics printed with solvent and latex inks, air forced over loosely rolled graphics will allow the solvent to evaporate. While some graphics may feel dry to the touch, they are often still in the process of drying below the surface. Allowing these graphics time to properly dry all the way through the material will result in a higher quality product. No matter how long you wait between printing and laminating, if you wind the graphic tight on a core, it will seal the solvent in and not dry properly.

The minimum recommended dry time before beginning any type of finishing process, including laminating, clear coating and trimming, is 24 hours. If the graphic is not properly dried, the solvents within the film can swell or soften, which can lead to

modification of the film, severe shrinkage and/or graphic failure. The solvents can also affect the adhesive and completely change carefully-designed film characteristics.

Lamination Basics for Inkjet Printed Graphics

Before you begin the lamination process, be sure you have a lamination machine that matches your printer width. Wipe down your laminator with 3M™ Tack Cloths to prevent any dust or material from getting trapped in the lamination. For more on laminating procedures, such as curing and outgassing, check out additional recommendations from 3M here.

After successfully laminating the graphic, it is time for a trim. For precision, use safety rulers to get a straight and even cut. Remove the excess material with weeding tools such as the 3M™ Air Release Tool.

Plotters

When it comes to plotters, make sure your purchase matches your printer size (either 48 or 60-inch). Distributors are always looking to get you the best deal with your printer purchase, so it's quite common to receive a package deal. Stand-alone plotters are a great investment if you are frequently printing more than one project at a time. By allowing you to print, plot and laminate simultaneously, stand-alone plotters are a huge timesaver for shops with a large workload. If you're a smaller shop or printing is only a segment of your business, many printers come with built-in plotters.
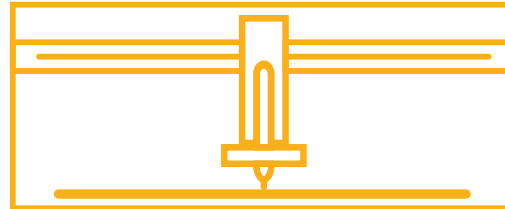
RASTER Image Processing (RIP) Software

All printers come with some type of RIP software. 3M has a large selection of media profiles, which can ensure quality results. RIP software comes with test images and processes to recalibrate your printer, which you can conduct monthly to guarantee all of your prints match and prevent the waste of time and material on redo's.

3M Graphic Materials Product Catalog

Successful printing is as much science as it is art. We know there's quite a lot to take in, but fear not. Quick and easy printing is achievable, especially when you're equipped with the right tools and are using the correct media. To look at some options, check out the *3M Graphic Materials Product Catalog*.

RIP

Hiring the Right People

A shop is only as good as its team. Along with investing in high quality equipment, hiring trustworthy and skillful employees is critically important for the success of any shop. Ideal candidates will know how to setup and maintain the printer, as well as troubleshoot issues that may arise. Additionally, they will be well-versed in the kinds of ink and media you use in order to produce stunning graphics.

Large format printing is not a skill that one can usually study at school, so those coming to your shop without experience will require thorough on-the-job training. Taking the time and sacrificing the resources necessary

Terms your operators need to know

Solvent Hybrid Ink Density Double-Sided Print
UV Raster images VOC Cure Settings Roll to Roll
Pre-press
Vector images Seven Color Four Color Latex DPI
RIP Six Color Flat Beds Profiles Color-White-Color
Spot Color Ink SAV Direct to Rigid Printing Eight Color

to provide your green employees with a well-rounded education should be viewed as an important investment in the future success of your shop. You can often receive training services for your employees from many Original Equipment Manufacturers (OEMs), as well as from color management and print industry professionals.

Hiring a knowledgeable and reliable operator who has learned from mistakes at other shops will cost more when it comes to payroll, but will save you time and money in the long run. In addition to saving you time and money on training, your more seasoned employees will be able to help or completely take over the training process of less experienced team members.

In addition to your in-house team, you will also likely be working with outside vendors. **Graphic designers can help you get the look your clients are asking for.** If you are considering going this route, confirm that they are competent in design specifically for print, not just web. This includes experience with pre-press, including bleeds, cropping and die cuts. There's a big gap in skill sets between digital graphics and web advertising, compared to the size and specifications required by print design.

Tip

An understanding for how the printing process works will generate great designs ideal for large format signage. As an industry standard, your graphic designer should be well-versed in the Adobe Suite. This is the leading software used for creating designs.

Adobe® Creative Cloud™

When it comes to installing the graphics you and your team worked hard to create, partner with an installer that is certified, authorized or endorsed. Researching and investing in a promising and reliable installer will better reflect the work of your team, and reduce the number of potential reworks and reprints. **At the end of the day, building your team is all about quality and dedicating your time and money where it will yield the most reward.** Figure out what is most important to you and your shop, and look for employees who can help you get there.

Managing Your Wrap Business Bottom Line

Printer Maintenance

Keeping your digital inkjet printer running as smoothly as possible requires care and attention. A balance of organization and attention to detail is necessary for your equipment to function properly and for work to maintain a steady flow. Equipment upkeep is just as important as managing your employees to stay on schedule, and produce high quality, consistent work across the board.

Printer Maintenance

Quite often, printers are finicky creatures and should be treated as such. Pay close attention to your manual to ensure that you and your crew are using the printer correctly and giving it the TLC that it needs to perform at its best. Your printer manufacturer's guidelines will be your savior when your printer needs maintenance. If the answer you're looking for can't be found in the guidelines, contact the manufacturer directly for further guidance. **Keeping your printer healthy and happy promises good printing and increases the printer's life**, as well as the lives of the print heads and mechanical parts.

If you do not have time to maintain it properly, consider a service contract. It can reduce the initial cost of ownership and may also be a lifesaver in the event that the printer malfunctions during the middle of a big job. A service contract is typically bought through the manufacturer or distributer.

Keep a Printer Maintenance Kit

Typical items for your maintenance kit:*

☐ Lint-free cloths and cleaning swabs
☐ Maintenance fluid and isopropyl alcohol
☐ Latex gloves, ventilation masks, and safety goggles
☐ 3-in-1 oil
☐ Spare parts including wipers, media cutting blades, dampers, ink filters, UV lamp filters, etc.

* Some printers may require specific maintenance products to prevent damage to the printheads and other integral components of the machine. Consult with your printer supplier or manufacturer.

—*Sign & Digital Graphics Magazine*, 2013

Managing Projects

Managing print projects can be a complex process. Unattended printing can free up more time in your schedule, but you must take the proper precautions in order to avoid accidents and time-loss.

First and foremost, it is vital to monitor ink usage, to make sure you have enough to complete the project. Next, double-check that the material you are printing on is correctly placed on the take up reel. And lastly, give yourself some wiggle room by ensuring the print is sized with additional space for padding, and that you've left enough media on the roll to finish the graphic.

One method for keeping your orders organized is a project tracking system. For each project, you can create a file with all the ins and outs to make sure you don't miss a thing – and if you do, you have proof of the original order. This filing system can include, but is not limited to:

- ▶ Job numbers
- ▶ Customer information
- ▶ A proof
- ▶ Lot numbers
- ▶ Materials used
- ▶ Finishing options
- ▶ Due dates

This can also serve as a checklist to ensure project management is running smoothly and nothing falls through the cracks.

Preemptively putting processes in place for the printing workflow will help you and your team maintain high productivity and make it easier for new team members and clients to learn the lay of the land. Having a schedule for routine printer upkeep and cleaning will also save headaches down the road.
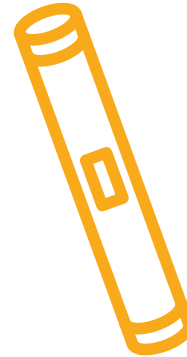
Packaging Tips and Tricks

If you need to package and ship your graphics, be sure the graphics are rolled with the graphics side out, on a 3–6" core. Add end caps and a protective layer outside to prevent the graphic from shifting or being scratched during delivery. All graphics should be inside a polybag when shipping. Do not stack too many graphics in one container to avoid any crinkling or damage to the material.

Selecting the Right Media

The media that you'll print on is the third major piece to consider when looking at the various inks and printers on the market. Some inks and media materials are more compatible than others. The *3M Graphic Materials Product Catalog* is a resource designed to help you select the best media for the job, and ensure your end results will be up to par.

It's also a good idea to keep a few go-to products stocked on the shelves that are especially versatile and compatible. Films like 3M™ Print Wrap Film IJ180mC-10, a cast film great for long-term graphics, 3M™ Controltac™ Graphic Film Series 40C, which is well-suited for shorter-term graphics, and gloss and matte overlaminates should do the trick. Having tried-and-true products at your disposal can save you time by cutting down on the trial and error of switching different rolls in and out of the printer.

3M Graphic Materials Product Catalog

3M also offers a wide-format inkjet starter kit to help you get started, and ensure your printer is properly handling media. Through this program, 3M provides sample media for your shop to test the performance of your printer and ensure optimal printing output.

A good launching point is downloading media profiles from 3M.com/mediaprofiles. The profiles contain the proper heat settings, ink restrictions, linearization, total ink limits and the ICC profile. Use these media profiles to your advantage, as they will help standardize the color output. This will make your printing process more predictable, and may help reduce ink usage.

Selecting the right media for your inkjet printer is a key component for achieving top-notch printed graphics.

Media Profiles

Warranties

When considering the plethora of inks and media on the market today, it's critical to examine the warranty that comes with them. Good warranties not only give you peace of mind, but appeal to potential customers and set you apart from other graphics manufacturers.

Warranties

3M™ MCS™ Warranty is the industry leading warranty, as it covers both the ink and the film it's printed on, and backs the finished graphic. 3M conducts extensive weathering tests on printed graphics to evaluate the performance and expected life of the inks.

3M provides warranties for finished graphics using all 3M materials (ink, film and overlaminate). Please visit their individual warranty pages:

MCS Warranty – Latex Inks

MCS Warranty – Solvent Inks

MCS Warranty – UV Inks

When 3M MCS Warranty approved inks aren't an option, consider the 3M Performance Guarantee. It guarantees the performance of 3M inkjet films, graphic protection and application tape when used with more than 40 OEM inks and printers.

Scouring the small print and reading warranties isn't the most exciting leisure activity, but it is an important aspect of researching and purchasing a digital inkjet printer for your shop. In the long run, the support of a strong warranty can protect your bottom line and ensure complete protection from ink to printer to media.

Managing Your Wrap Business Bottom Line

Conclusion

There are many factors involved with printing that can put your shop ahead of the competition and help you stay on top of important projects. **Taking these proactive steps and doing things right the first time will help you get into a comfortable workflow and set a standard for what kind of work is expected from yourself and your employees.**

Don't feel like you have to rush. Take your time researching and weighing all of your options when it comes to inks, printers and media before you make a purchase. Exploring the wide variety of options and how they work together will amplify your success.

Nuances between solvent, latex and UV inks could make all the difference. Identify what you need to be successful. Looking for more flexibility? Dig into solvents. Interested in a more sustainable solution with less solvent? Latex, the latest ink technology, could be exactly what you're looking for. Is it shorter drying time and large-scale production? UV ink might be the best fit for you. After selecting your ink type and media, don't forget to read up on warranties and how they can work for your shop and your clientele.

Purchasing the right printer, hiring dedicated employees and implementing efficient procedures are important factors for the success of your business. At 3M, we're excited to help you get the most out of your printer, inks and media. When you have questions, the experts on our tech service team are standing by to offer answers and options.

3M Commercial Solutions
Digital Marketing Resources

If you found this article to be helpful, we invite you to check out the following articles, all aimed at helping you build your graphics manufacturing business.

- ▸ How to Grow Your Wrap Business
- ▸ How to Use Digital Marketing to Reach Customers
- ▸ Managing Your Wrap Business's Bottom Line

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