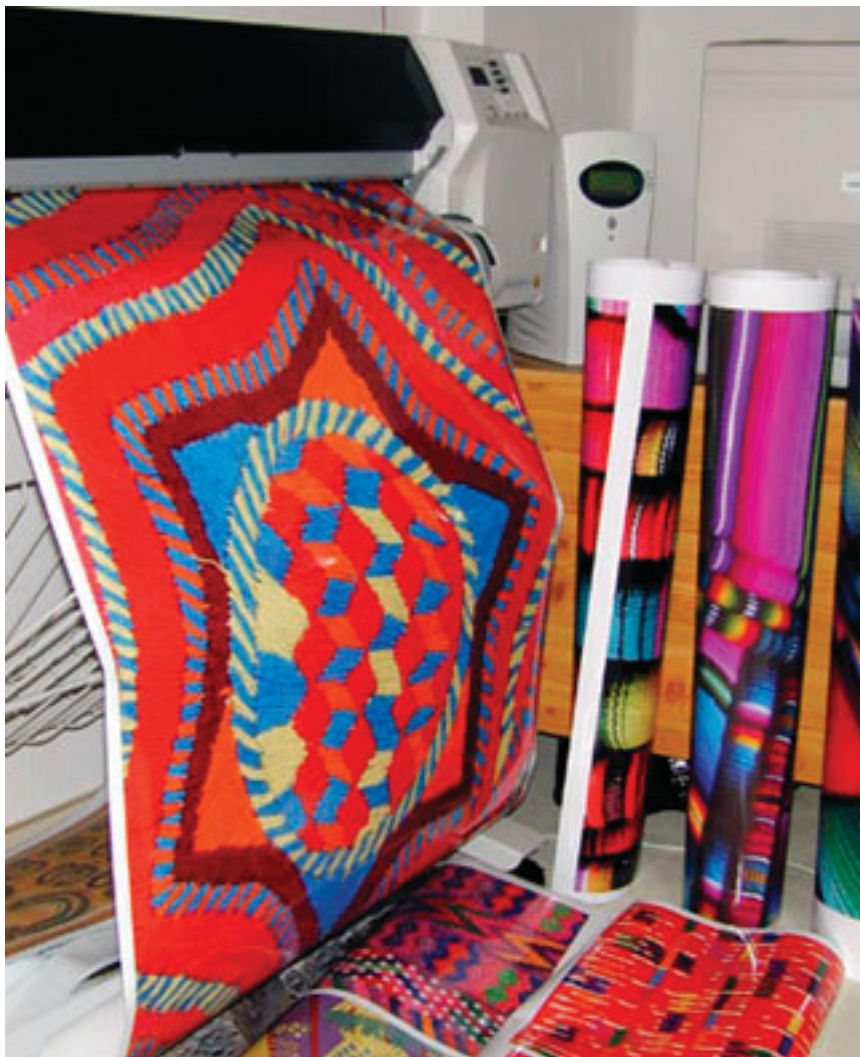# 10 Tips on How to Achieve Great Prints with Your Wide Format Inkjet Printer

Years of photography, scanning, and printing experience allow Nicholas Hellmuth to share his knowledge in the FLAAR Reports. Shown here, printer and media comparison tests when the FLAAR evaluation facility was in Germany for several years.

Abstract

This FLAAR Fast Facts is a quick tour of your wide format inkjet printer as a system. A system implies that each component must work well with the other components. This report serves as the previews of what factors control print quality and preview of which FLAAR Report SERIES provides all the tips and help for each factor.

"How to achieve great prints" is primarily for the first-time user of a large format inkjet printer but is also applicable to desktop size 11 x 17 and 13 x 19 inches (A3 and oversize in Europe).

Prepress professionals can learn tips and insights from the fact that FLAAR has 18 wide format printers, many years of experience, and a world-wide network of end-users of wide format printers sending in information every hour (that's people like you sending in your Survey Forms).

1, Input

At tradeshows you can see million-dollar wide format printer manufacturers using photos from some CD that they bought from some internet source.

The images are pixilated, fuzzy (out of focus or blown up more than the resolution on a CD will allow). These stock photos have dust, hair, and defects from scanning. The scans usually reveal the grain pattern of the original film.

The result is that the output from the printer looks awful. Kind of difficult to understand why manufacturers will showcase such mediocre images.

When you finally have your own printer, you will wish to avoid the problems of low resolution, lousy scans, and inadequate images. To assist you every pertinent SERIES (series on printers for signs, series on printers for photographers, series on printers for fine art giclee) each include one report on scanning.

Whereas some tradeshow booths enlarge bad images, other tradeshow exhibitors know how to get stunning results. Epson is the most sophisticated of all. Epson uses the absolute best images from leading American photographers. This is not clip art or stock photos. However the reverse problem pops up here, their photos are so incredibly good, it leads you to assume that your photos will look the same… if you just would buy their Epson printer and not the printer of any competitor.

The allusion is assuming that it is the printer that makes the print good. Sorry, it does not work that way. A good printer makes a bad print look worse (because a good printer shows the bad features of your image in outstanding clarity!). So what FLAAR works on is how to achieve good images to being with: either scanning or with fresh digital photography.

Look at the unattractive banding. This is caused by the printer. Notice the unsightly grainy pattern. That is partially caused by the Lexmark printheads on an entry level Encad NovaJet 736 printer, and partially caused by scanning problems. Photographed in the Scanvec-Amiable booth at Graphics of the Americas tradeshow, early 2003. The FLAAR course on digital photography over the Internet and the FLAAR+BGSU workshops can help you avoid these problems. If you had the proper camera to begin with, the best RIP to begin with, and a better printer, this print would not have had the obvious and unsightly flaws you see here.

FLAAR+BGSU is also considering hosting a workshop on digital photography for giclee printing. If you wish to meet Nicholas in person and attend a workshop write FLAARtest@aol.com.

2, inherent quality of the original image.

Scanning a color negative may result in a poorer image than scanning a color transparency.

Scanning a print will definitely result in a lesser image than scanning the original negative or positive slide.

Burned out highlights and excessive darkness in the shadows result in lack of detail. You can not see the texture of the original surface in an overexposed white portion of your image.

You can't see much detail in poorly illuminated areas of your scene, especially because CCDs and CMOS sensors will produce noise in these areas.

A photograph taken on a sunny day, or even if in shade, if you have adequate illumination, will print wonderfully. But an image with inadequate illumination will be weak, have noise, and just won't stand out as an acceptable print.

An image with pinpoint sharpness and adequate depth of field will tend to look better than an image which is slightly out of focus. Main exception would be portraits: you don't want to over emphasize skin blemishes on the bride, or on the groom, or in-laws either.

Digital cameras have a hard time producing a fully sharp focus. Part of the problem is in using traditional lenses. They were never designed to use with CCD sensors. If you are using medium format digital back on a shift-and-tilt camera, you need a digital lens. If you are using large format tri-linear scanning back on any camera, then APOchromatic lenses will tend to result in better quality.

In other words, you need a good image to start with if you expect to produce an outstanding print.

3, resolution of the image

The FLAAR Report on resolution will help you know how many pixels you need in your print. As the series are expanded there will be one report in the wide format printer for Photo series, and another report on resolution in the giclee fine art printers series.

We explain this further in the course on digital photography as input for wide format inkjet printer output. You can also acquire this information from upcoming workshops now being organized by the combined staff of FLAAR and BGSU.

In either FLAAR source you will learn that pixels and dpi are two totally different sets of measurement that mistakenly got mixed up in the early days of digital imaging. Essentially it's as follows: scanners and digital cameras produce pixels; printers print pixels with ink drops. Laser printer drivers operate in line frequency. When you are in the world of digital printing with inkjets you can blissfully ignore line frequency (which is how offset print resolution is calculated).
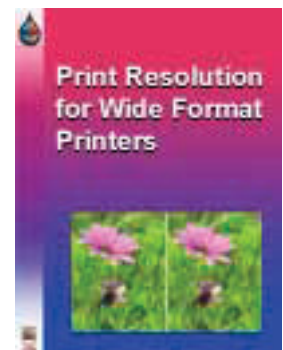
 # 4, preparation of the image in software.

We cover this in the FLAAR course on digital photography. But essentially image preparation involves using Adobe Photoshop. But there is other software that some people don't know about, such as various products from nik multimedia. Nik software in some cases will do the job better than the same aspect of Photoshop. Nik is add-on software made in Germany but fully available in English and with full tech support in the USA.

If you are good at software preparation of the image, your printed output will look considerably better. But at the start, most novices ruin the pictures with over-enthusiasm. Gradually you will acquire experience and soon your prints will look great.

Although we use Adobe Photoshop we have found that other software, such as from nik multimedia, offers advanced features that compliment Photoshop. Therefore we have a comprehensive unit in the Photo Course on "software other than Photoshop." This course is available in the comfort of your home or office, anywhere in the world, via the Internet.

 # 5, selection of printhead technology

Your options are
- piezo-electric, high quality
    - Epson
    - Mimaki
    - Mutoh
    - Roland
    - And other clones using Epson printheads
- Industrial piezo
    - Xaar heads (average)
    - Spectra heads (better than average)
    - Brother (fabulous, but they don't work at high speeds)
- Thermal, bubble-jet, high quality
    - Canon (uses its own heads)
    - ColorSpan (uses HP heads)
    - Encad (uses Lexmark heads)
    - HP (uses its own heads)
- Continuous inkjet, Hertz technology
    - Iris giclee printer (no longer manufactured, available only reconditioned as Ixia)

We cover the pros and cons of Epson, HP, Lexmark and Canon printheads in the Survival series.

Glossary of Terms Related to Wide Format Inkjet Printers

Standard Printer Evaluation

Wide Format Inkjet Printer Applications

List of Wide Format Printers

Survival Guide

We comment on Xaar and Spectra heads in the series on printers for signs (solvent ink).

We report on the problems with the Brother printhead in the detailed report on the Kodak 5260 printer (which failed to function and was withdrawn from the market in a multi-million dollar debacle). This report is in the photo series.

 # 6, selection of appropriate inks

Your options are
- Dye inks, water based
    o Regular dye inks, brilliant colors, for a few days, fade within months, early Epson inks
    o Long life dye ink, brilliant colors, last years, first implemented by Ilford
- Pigmented inks, water based
    o Brilliant pigmented inks, relatively new; colorful but don't last as long as regular pigmented inks. Ultrachrome is first of this new breed of inks, for Epson.
    o Regular pigmented inks: what you get in HP, and most other printers
- Solvent ink
    o True solvent ink
- Various kinds of pseudo solvent ink
    o Eco-solvent
    o Lite-solvent
    o Pseudo-solvent ink, really a kind of oil-solvent ink, for Roland SolJet
- True oil-based ink (for Seiko and XES, Xpress and ColorgrafX X2 models)
- Textile inks
    o Reactive dye
    o Acid dye
    o Ink for heat transfer from paper to material, "dye sublimation"
- Thermal transfer
    o Wax ribbons
    o Resin ribbons

Textile inks are covered in the FLAAR Report on printing on textiles.	Thermal transfer printers are in the report of like name.	Water based inks (dye and pigmented) are in the FLAAR	Solvent ink printers are in the report SERIES on Solvent.
Printing on Fabrics	**Thermal Transfer Printers**	**Suggested Media for Signs, Posters and Banners**	**Solvent Ink Printers**
Bonus Report	part of Sign Series	Report SERIES on inks and media.	part of Solvent Series

7, selection of appropriate media.

With a laser printer, you use regular paper. The image may look better on a thick glossy material but otherwise, a print on laser paper looks just like every other print on laser printer (unless you know how to tweak the printer driver software options and unless you use a really outstanding paper made specifically for a color laser printer).

Hence I smile whenever I go into Staples or Office Depot and see paper claiming "for laser and inkjet printers."

That paper does not have an inkjet receptor pre-coating. It merely is less ghastly than regular bond. No way that one paper can be good both on a laser and on an inkjet printer.

To reproduce the brilliant colors that your printer is capable of, you need to use paper preconditioned with an inkjet receptor coating. That's why true inkjet paper is more expensive than regular paper.

Selection of the proper paper, canvas, vinyl or other material is so important as a factor in final appearance of the quality that we have prepared an entire FLAAR SERIES on inkjet media.
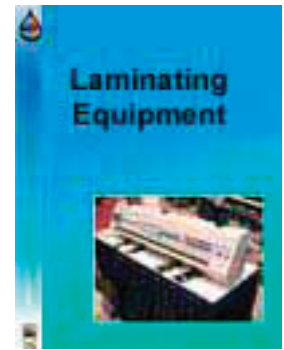
Evaluation of Inkjet Media for Wide Format Printers

Inks and Colorants for Large Format Printers

Suggested Media for Signs, Posters and Banners

Frequently Asked Questions on Media

Reliable Sources of Media

8, how to achieve water proof inkjet prints?

It is logical to think that the ink must be water proof to result in a water resistent print. Actually that is now how it works. Two FLAAR Reports discuss how to actually water proof your inkjet prints:

•	*What you can still do to a Giclee Print, After you have finished printing them.* This is in the Giclee Series.

•	*Laminating Equipment for Large Format Inkjet Printing.* FLAAR Fast Facts. List of where to go for specific information on each size and class of laminating equipment. This report is free when you send in the Survey Form.

9, understanding color management

If you are clever, good with Adobe Photoshop, with some luck and skill you can survive without ICC color profiles. But if you are a commercial company printing for demanding clients, you will need color management.

FLAAR is an institute dedicated to photography. So in 1997 we used our Encad to print photographs. Today we still print photographs, but at giclee quality (and the Encad has long ago been replaced by ColorSpan, HP, Epson, and Mimaki printers).

Since we are a non-profit educational institution, color management tools and software were too expensive in our early years. We learned to tweak the pictures in Adobe Photoshop and got exhibit-quality results that

Iris giclee printer in the middle; other of the more than dozen large format printers in the FLAAR evaluation facility on either side. Our ability to assist our readers is based on first-hand knowledge acquired over many years of practical experience.

hang in the museum. Our photographs of Mayan antiquities and indigenous Maya costumes and weaving handicrafts are popular at other museums as a traveling exhibit.

All blissfully without color management.

But if you are printing commercially, then the people who pay you expect you to match their colors, precisely, and every time.

Artists demand their oil and watercolor paintings look the same on inkjet media as they do in the original painting (of course that is not possible in the real world, but you can get very close).

Companies demand that their corporate logo colors are correct to the Pantone number (again, not always possible in the real world, but you can get close enough to get the advertising director to quiet down).

Of course today FLAAR has color management fully installed at one university and in preparation to install at the other.

 # 10, understanding RIP software

A printer driver is what tells your printer to produce a basic print. Has few options.

RIP software, in distinction, is a printer driver on steroids that controls and tweaks just about every aspect of your printer's capabilities such as

- Screening algorithms
- Number of printing passes
- Direction (uni-directional or bi-directional)
- A further list of capabilities sufficient to fill an entire FLAAR Report.

The monitors show various images from the FLAAR Photo Archive, in this case textiles from the Museo Ixchel, Universidad Francisco Marroquin, Guatemala. The prints are being produced at Parrot Digigraphic.
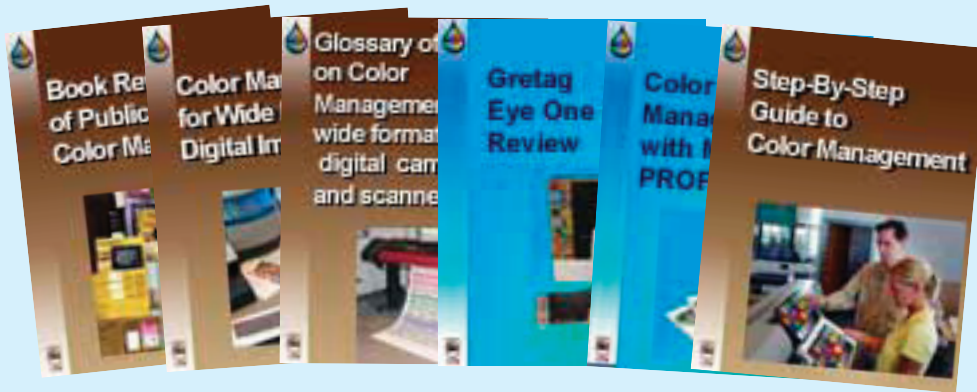
RIP software is also where you apply your color management and ICC color profiles.

All your options are in your RIP (if you were clever enough to select a RIP that offered those options; hence avoid early hardware EFI Fiery RIPs which lack basic options which are found on most software RIPs).

Summary

If you take the same identical image and print it 10 times with the same identical printer, but use a different kind of paper each time, you will get 10 different tones of color. That is because inkjet printers don't print on paper, they print on the microscopic coating layer, the "inkjet receptor coating." The chemistry of this is different on canvas from watercolor paper. Indeed of the 6 kinds of canvas, each one may produce a different color gamut. Now you know why you can't escape learning about color management.

That is why FLAAR has spent so much time, energy, and budget preparing "how to" reports to assist you. Our goal is to make using wide format printers as easy as possible.

www.wide-format-printers.org	www.fineartgicleeprinters.org	**CLICK HERE TO VIEW EACH FLAAR NETWORK SITE**
www.digital-photography.org	www.flatbed-scanner-review.org	
www.laser-printer-reviews.org	www.cameras-scanners-flaar.org	www.large-format-printers.org
www.FLAAR.org	www.ctpid.ufm.edu.gt	www.wide-format-printers.NET

Please realize that all reports are in Adobe Acrobat PDF format. The reader software is free from www.adobe.com/products/acrobat/readstep2.html. PDF files are intended to be read on your computer monitor. Naturally you can print them if you wish, but if the photographic images within the reports were high enough dpi for a 1200 dpi laser printer it would not be possible to download them. So the images are intended to be at monitor resolution, naturally in full color. FLAAR itself makes the files available only in PDF format because that is the international standard. We have no mechanism to print them out and mail them.

Obviously if you have downloading problems we will try to help, but please realize that we assume you have a 56K modem (or better) and capabilities to handle a basic PDF file.
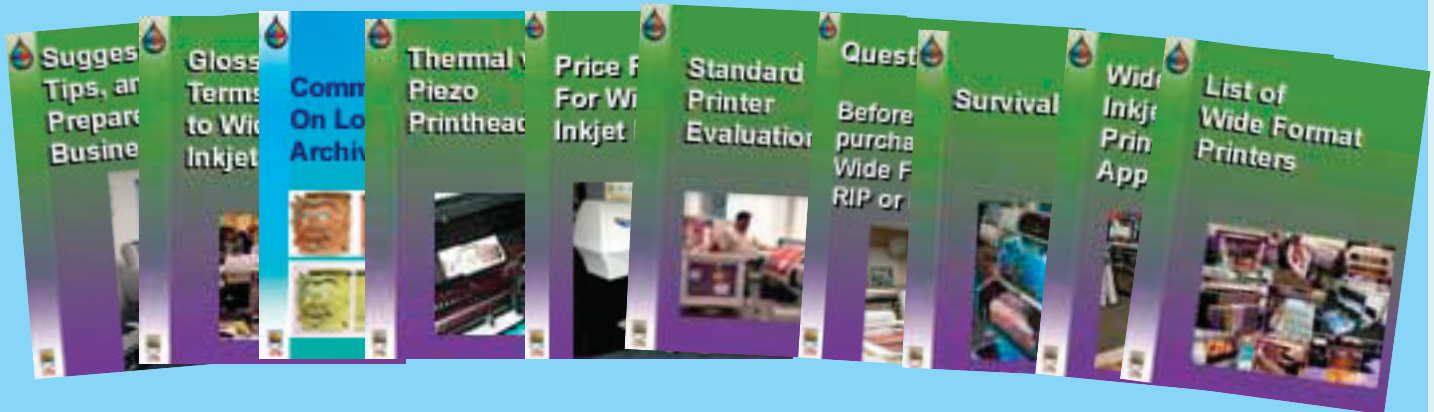
Acquire these reports at:

www.wide-format-printers.net

Color Management Series

Book Review of Publications Color Management

Color Management for Wide Digital Imaging

Glossary of on Color Management wide format digital cameras and scanner

Gretag Eye One Review

Color Management with ICC PROFILES

Step-By-Step Guide to Color Management

Survival Series

Suggestions Tips, and Preparations Business

Glossary Terms to Wide Inkjet

Comments On Longevity Archival

Thermal Piezo Printheads

Price For Wide Inkjet

Standard Printer Evaluation

Questions Before purchasing Wide Format RIP or

Survival

Wide Inkjet Printing Applications

List of Wide Format Printers

CAD Series

HP DesignJet 5000

Canon Wide Large Format Printer Setup Notes

Inkjet Printing CAD & GIS Pros and Cons Laser – Electrostatic

HP DesignJet 800ps Evaluation CAD and

CAD, Aerial

Epson Pro 7 Ultra Evaluation Review

Canon ImagePROGRAF W8200 12 Wet and Evaluation

Evaluation HP DesignJet FLAAR Testing

HP DesignJet 5500ps Large Inkjet

Oil-based Wide Special for with

Evaluation Canon Six Large Printing

HP 500

Comments on Wide Format Scanners

DP 101 : Achieving Quality in Digital Photography
(Curious & Interesting through Intermediate Levels)

SLR 35mm Digital Cameras

Nikon D100 Digital Camera

Sigma SD9 Foveon

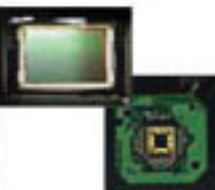**History and Timeline of Digital Photography**

Professional Results from Budget-Priced Cameras

Pros and Cons of Digital and Film Photography

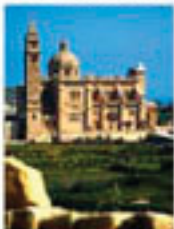**CCD and CMOS Image Sensors**

Nature Photography

Photograph Composition

Portraits: Studio and Location Photography

Architectural Photography

Quicktime Virtual Object Movies

Equipment: On Location Photography

Computer Equipment for Digital Imaging

Camera and Computer Memory Storing Digital Files

File Formats for Digital Images

Hybrid Digital Cameras to hold Medium Format Digital Backs

Adobe Photoshop for professional Digital Photography

Lenses and Filters

FLAAR Book Review on: Digital Photography

For additional information on any FLAAR course you can write Nicholas Hellmuth and/or the course assistant Sebastion Dion directly at digitalphoto@FLAAR.org or fax 419 372 8283.

Digital Image Resolution

Medium Format Digital Scanning Backs

Landscape Photography with Medium and Large Format Cameras

Pros and Cons of Digital vs Film Photography (Medium and Large Format)

Computer Workstations for Digital Photography

Nature Photography with Medium and Large Format Cameras

Equipment: Studio Photography

Lighting Digital Photography

How to do a Rollout Photograph of a Cylindrical Object

History of Rollout Photography

Panoramic Photography for Digital Cameras

History of Panorama Photography: Circa 1840-1980

Digital Panoramic Cameras

Taking Photographs with a Reprographic Copy Stand

Workflow Summary for Medium and Large Format Digital Photography

Color Management for Digital Photography

Glossary of Digital Photography

Architectural Photography with Medium and Large Format Cameras

Bit Depth and Dynamic Range

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