



## Previews of the FLAAR Reports in the Series

### What Wide Format Inkjet Printers are best for Signs, Posters, and Banners



Mutoh Falcon II printer at SGIA tradeshow

## Introduction

Printing signs can be a lucrative business. With an inkjet printer you can be more flexible than an older company laden down with screen printers or aging electrostatic equipment.



Every week a shop based on vinyl cutting equipment will write and ask if FLAAR can help them learn about digital wide format inkjet printers. They tell us they are losing business to a new digital print shop across town. Yes, we can assist in learning wide format inkjet printing, indeed this is the goal of our university, to assist individuals and companies enter the digital millennium.

Here is a question we get every day:

*"We are looking for an all-purpose printer. We need something that has ...quality for photographs, but is also capable of doing prints for outdoor signs without laminating."*

In today's markets, if you wish to survive printing signs, you also need to learn how to print giclée and lots of other applications. Since FLAAR print facilities at two universities handle signs, posters, banners, and also fine art giclée, you can learn from Nicholas Hellmuth's first-hand experience.



When BGSU needed a large banner, we found that the ColorSpan was a good choice: fast, and the dye inks hold up an acceptable length even in well-lit situations. Dye inks from other printers fade too quickly.

The past several years have witnessed substantial technological advances. However as a savvy buyer, you need to learn the pros and cons of piezo printheads vs thermal printheads.

Point of sale signs get more popular every day. Just go to any mall, car dealership, or grocery store.

Bus wrap, truck side advertising: this is increasingly printed by inkjet printers.

*Another question people ask is what printers can also cut? People think there is only one brand of printer-cutter. Actually there is a second brand, and it too can use pigmented ink. Yet there is software readily available that will allow you to print faster if you cut with a separate cutter. That is because one of the popular printer-cutters is terribly slow, and prone to banding defects. We describe these situations in the main FLAAR report on printers for signs.*

Over 19,000 people sent a personal e-mail or fax asking for assistance in what inkjet printer did we recommend. Last year more than a quarter of a million people read the FLAAR reports on the Internet. Today, with over 20 employees to handle this volume, we are asking for the assistance of readers to contribute towards the overall program by chipping in to help pay for the research which goes into these reports. Thus for people who wish to learn about printers for signs, posters, and banners, we have dedicated the last several months forming a package of multiple reports just for your applications and needs.

## Two levels of reports for you

As part of its program for public education, FLAAR and the two universities where our evaluation centers are situated make two levels of reports available. Entry-level material is available at no cost in easy-downloading Adobe PDF format. Just find one of our Inquiry Forms on a site in the FLAAR network and specify what you need (and what your printing requirements are).

However many of our readers have written and said they prefer to get the entire batch of FLAAR Reports on signs all at once. They asked that we figure out a way to sell them to avoid having to fill out an inquiry form for every new batch. It has taken us 8 months to establish a separate web site system so you can order any report-group you wish and simply pay for them (without need of filling out an inquiry form). This new system is [www.wide-format-printers.NET](http://www.wide-format-printers.NET)

You get an automatic \$22 discount by having filled out a Survey Form previously (if you did not fill out a form earlier, you can fill one out now and get an instant discount). Or you can just charge the full amount on your credit card and not bother filling out the form. Either way, once you place an order, our university will send you the following FLAAR Series of reports on things you need to know about wide format inkjet printers if you intend to print signs, posters, and banners, whether for indoor or outdoors.

Plus, since we realize you may want to print other things, we include tips for other applications as well.



Above, ColorSpan DisplayMaker printer. Below, Graphtech booth



### ***Which Wide Format Printers are Best for Signs, Posters, Banners: POP and other indoor signs.***

A comparative review of Graphtec, Encad, HP, Roland, ColorSpan, Epson, Mutoh, PrismJet, Mimaki, and others.

This publication is based on piercing analysis of the ad claims of Epson, Roland and other manufacturers relative to speed, longevity, and print quality.

Frankly, it's a public embarrassment what some of these printer companies claim their machines will accomplish. The ad claims are very impressive... for their total twisting of reality, for really clever morphing of two totally unrelated facts in an attempt to make a claim that is not true if you know the printers in real-life.

But every printer tends to do at least one application very well. So the key is to wade through the swamp of festering hype and find the tidbits of what the WonderWidget 200000 will actually accomplish, in your print shop.

#### **Contents**

##### Abstract

Western Graphtec: An Ideal General Purpose Printer for Signs and Posters

Piezo Printhead Reality: Epson

Epson 7500 and 9500

Epson 7600 and 9600

Epson 10000

Older Epson Printers: 7000 and 9000

Epson printers and RIPs

Limitation on kinds of Ink

Mutoh: I-JET, Kodak, PrismJet from SignWarehouse

The next generation of Mutoh Printers

Other Mutoh Printers

Mimaki

Encad or Hewlett-Packard?

Older Encad Models

Encad Models from year 2000

Newer Encad models: year 2001

and 2002

Issues with Encad service

Encad NovaJet 880

OEM versions of Encad printers

Oce also sells Encad printers

Ink Cost

ColorSpan Printers

ColorSpan Mach 12

Canon

Roland

Roland ColorCamm (thermal transfer with wax or resin ribbons)

Roland CammJet (printer-cutter)

Roland Hi-Fi and V8 (traditional wide format inkjet)

Retrofitting a Roland with solvent ink

Thermal Printhead Systems (HP, ColorSpan, Encad, and Graphtec): Advantages over Piezo (Epson, Roland)

Pigmented Ink for the HP 5000 and 5000ps

Pricing

Comments on HP DesignJet printers

HP 5500

HP 650, HP 750

HP 500

HP DesignJet 1050, 1055

HP 800 vs HP 1055?

What Printers to Watch Out For?

What is Banding?

Printing on both sides of the paper?

Print film positives (for screen-printing)

How much DPI is really needed?

Can you actually let your printer run overnight unattended?

Sign layout software

RIPs

Summary

Where to Find What You Need

How are evaluations accomplished by FLAAR?

Glossary

What did you learn from this report?

Other Pertinent FLAAR Reports

Legal notice

Advisory

Acknowledgements

You may also be a little bit surprised to learn that the prints you see at a tradeshow, and in the flashy ads, well, can't really always necessarily be accomplished in your sign shop. We caught one company skillfully and slyly laminating its prints at tradeshows (because their ink would not accept glossy media). We caught another company laminating its prints because if you did not laminate them, the print would decompose.

So surprise, if you buy our WonderWidget 200000, you also have to buy a \$29,000 laminator too!

We can't protect you from all the machinations the clever manufacturers conjure up, but we have spotted most of the glaring half-truths, fictions, and outright exaggerations.

These reports condense Dr Hellmuth's scrutiny of dozens and dozens of makes and models of wide format printers from the following information sources.



### ***Thermal Transfer printers.***

This report covers a useful technology featuring wax and resin ribbons to print continuous tone. You cannot get continuous tone with an inkjet printer; only from thermal transfer or laser light RGB imagers. So if you or your clients need true continuous tone, you better read this report. We discuss the Matan Sprinter and comparable printers.

### **Contents**

Introduction  
Downside of Thermal Transfer systems  
Desktop Size Thermal Transfer Printers  
Wide Format Thermal Transfer Printers  
Roland  
Matan  
Summa

You can also do dye sublimation heat transfer  
Advantages over inkjet  
Summary and Conclusions  
Glossary  
Bibliography  
Notes



### ***Dye sublimation***

*Which large format printers can accept dye sublimation inks for subsequent heat transfer onto T-shirts, textiles, curtains, table cloths, hats, coffee mugs, ceramic tiles, even metal (aluminum with prepared surface). Please note: we review only, and exclusively, 24" and above. We do not cover desktop printers.*

### **Contents**

Abstract  
Quick and Easy Explanation: What is the Technology Involved in Dye Sublimation?  
Which printer?  
Dye Sub with an Electrostatic Printer  
Dye Sub with regular Inkjet Printers  
Dye Sublimation with laser printers  
Dye Sublimation Inks  
Transfer paper for dye sublimation  
Thermal Transfer Technology  
Dye Sublimation Supplies: Heat Presses  
Using special industrial printers for flat or rigid objects  
Sources and Resources  
Other Sources of Information  
Further Information  
Summary  
Bibliography  
Advisory  
Acknowledgements

***Digital Photography and Scanning for Sign Shop Operators: Scanning Images for using on a Large Format Printer. I***

If you are moving from being a screen printer or vinyl cutter into inkjet printers, it may help to have some tips on scanners, digital cameras, and digital imaging. This report discusses which scanner is best to handle your negatives and transparencies? How to Digitize objects that are too large for a flatbed scanner? (scanner vs digital camera)



## Contents

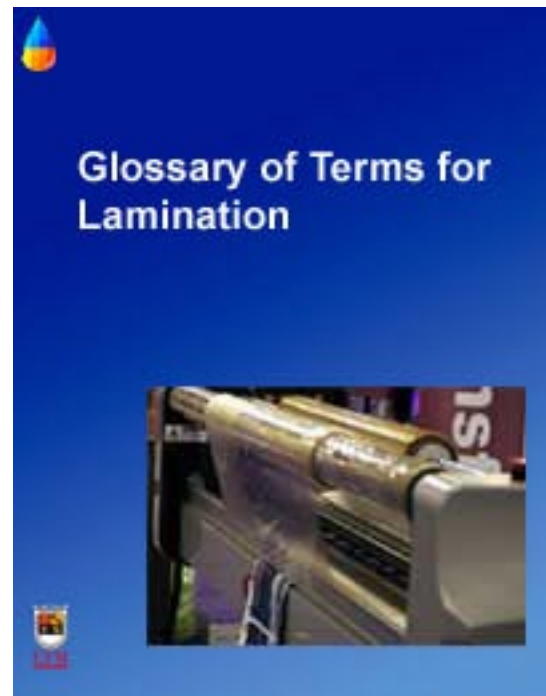
Abstract  
 Digital Photography  
 Can you use your mega-pixel digital camera?  
 Scanners and Scanning:  
     flatbed,  
     35mm scanners,  
     drum scanners,  
     wide format scanners  
*Clean Scans*  
*Kodak Photo CD and Kodak Scanners*  
*JPEG and Compression Schemes*  
*Scanner Selection*  
 Scan the original negative or scan the print?  
 Scanning Color Negatives  
 Black and White Images  
 CMYK or RGB ?  
 What scanners does the FLAAR Photo Archive use?  
     *Fuji flatbed scanners*  
     *UMAX scanners*  
     *What about the Imacon scanners?*  
     *Aztek Plateau*

Reality of good scanners  
 Toaster-sized 35mm slide scanners  
 Older models of scanners or used scanners  
 Newton Rings  
 We don't recommend entry-level flatbed scanners  
 Scanner software  
 Overhead Scanning Systems to handle large originals such as paintings  
 Which computer to use?  
 Software  
 Summary  
 Where and How to Store your scanned images?  
 Summary of Where to Buy and/or Where to obtain Further Information  
 Other  
 Books on Photography and Scanning  
 Sources and Resources on the Internet  
 For further information  
 Advisory  
 Acknowledgements

***Laminating Wide Format Inkjet Prints: Glossary of terms***, new June 2003.

Sooner or later you will need to know at least the basic facts about lamination and the difference between cold lamination and hot lamination. Whether you are a sign shop, photo lab, screen printer switching to inkjet, or in-plant print facility in a corporation, this comprehensive glossary will be helpful to understand lamination equipment, supplies, and techniques. This informative report also provides tips on where to go for free manuals which will explain whatever else your heart desires to learn about laminating inkjet prints.

**acrylic**  
**application tape,**  
**adhesive**  
**backing paper**  
**base**  
**bends or kinks**  
**blistering**  
**bubbles**  
**carrier**  
**cationic adhesive.**  
**cationic method:**  
**chuck**  
**clear finish**  
**clear roll film**  
**clouds** are nice on a sunny day but not nice inside your lamination.  
**clutch**  
**cold film**  
**cold lamination** and how does this differ from hot lamination?  
**contact time**  
**cool lamination** See also cold lamination  
**co-polymer**, what a pain, so we work hard to clear up the chemistry jargon.  
**core chuck**  
**core thickness** or **core size**  
**crystal finish**  
**cure through**  
**curling** of the print is something you want to avoid.  
**curing time**  
 de-lamination, **helps to know how to avoid this.**  
**dimpling**, and what may cause it.  
**dry lamination**  
**dry mount tissue**  
**dry mounting**



**dry mount press**  
**durometer**  
**encapsulating or encapsulation**  
**exit temperature**  
**feed table**, see **table** (infeed and outfeed table).  
**film**  
**finish**, do you prefer matte or shiny (glossy).  
**finishing**  
**foot control**  
**floor graphics**  
**foot print test**  
**gloss finish** but what about **matte, crystal, luster, matte, and satin.**  
**heat activated film**  
**heat shoes**, are they good, or bad?  
**high pressure laminate**  
**hot film**  
**hot lamination**, does inkjet paper (and ink) survive this process?  
**hybrid process**  
**idler rollers**  
**image enhancement**  
**infeed trimmer**  
**lacquer**  
**laminant**  
**laminate**

**lamination**, that is what this glossary, and entire Series by Nicholas Hellmuth, is all about.

**liquid laminate** has many advantages. So what are the disadvantages?

**low activation temperature**

**low density adhesive**

**low melt adhesive**

**low-temp heat mount**

**luster**

**mandrel**

**matte film**

**milky**

**mil thickness**

**monomer**

**monomeric**

**mount**

**necking**

**nip**

**outfeed trimmer**

**over-laminate**

**polycarbonate**

**polyester**

**polyethylene**

**polymer**, again, we try to help explain so you don't need a chemistry course.

**polymeric**

**pouch lamination**, we have one so can explain its pros and cons.

**pressure sensitive adhesive**

**pressure sensitive pouch**

**pressure sensitive**

**pressure-sensitive / cold**

**print curl**

**printable laminate** is a recent breakthrough.

**protection**

**PSA film**

**PVC** Poly Vinyl Chloride

**repositionable adhesive**

**resin**

**rewind**, but as a noun

**roll feed tray**

**roll lamination**

**satin finish**

**scratch resistant finish**

**select pouch film**

**shoes** *see also* heat shoes

**silvering** is something else you want to avoid

in your finish.

**slitters**

**spray laminate**

**standard clear pouch film**

**stretch marks**

**substrate**

**supply roll (mandrel)**

**surface pyrometer**

**tables**, such as infeed **table**, outfeed **table**.

**tack bar** is not a place to go after a fishing trip.

**takeup mandrel**

**tape laminator, tape lamination**

**tension knob**

**texturize**

**thermal films**

**thermal hot mount**

**thermoplastic resins**

**thermosetting condensation resins**

**transfer tape**

**trimmer**

**trimming**

**tunnel or tunneling**

**UV or Ultraviolet cured**

**underlay**

**unwind**

**UV/UL pouch**

**vacuum laminator**

**variable speed control**

**waves**

**waviness**

**web**

**webbing the laminate**

**wet lamination**

**wind-up**

**wrinkles** are what we try to avoid by providing this glossary.



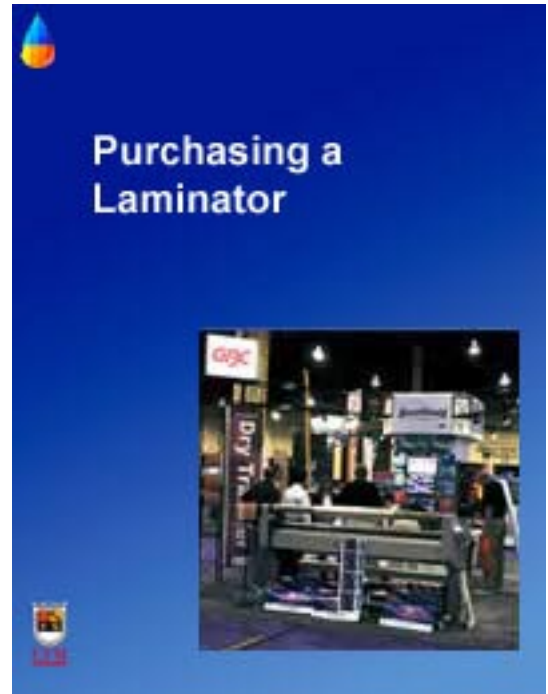
Ledco Laminator

**Questions to Ask before you Buy or Pay For a Laminator for Inkjet Prints**, new June 2003.

This is one of the FLAAR Reports which serves to assist the owner or operator to save their hard earned money by becoming a savvy buyer. An educated buyer makes it tough for anyone to fool you.

**Contents**

- Introduction
- Make a Check-off List for yourself
- Other questions to ask
- Resources



***Tips on how to select which wide format printer to buy for printing signs: ColorSpan DisplayMaker XII, new June 2003***

This report is the start of an entire new series, "**Site-Visit Case Studies.**" A team of FLAAR staff go to visit actual sign shops who are using printers in real-life situations. We check things out, ask pointed questions, and write down what you can expect this printer to accomplish. We list point blank what the printer is good at, and what it is incapable of doing. So this is an unparalleled opportunity to save yourself time by learning from all the work of FLAAR to provide public education through the university where FLAAR is headquartered.

#### Contents

- Introduction
- Initial comments by the print shop owner
- Specifications: Printhead
- Specifications: Printhead; Testable aspects
- Specifications: Set-up of the Printer; Tech Support
- Specifications: RIP
- Specifications: Ink
- Specifications: Media
- Specifications: Machine Build and Mechanics
- Assessment of Advertising Claims
- Comparison with Piezo printers
- Comparison with HP DesignJet
- Conclusions
- Appendix A



***Evaluation of a ColorSpan DisplayMaker XII Based on Interview and Inspection of this Printer in a Successful Sign Shop, new August 2003.***



We found two different sign shops which each had a ColorSpan for printing posters, signs, and photographs. Both shops were a few miles from our university so we visited them. These reports provide an opportunity to learn what it is like to have a ColorSpan printer in your office.

#### Contents

- Introduction
- Results of the Inspection and Interview
- Specifications: Printhead
- Specifications: Printhead; Testable aspects
- Specifications: Set-up of the Printer; Tech Support
- Specifications: RIP
- Specifications: Ink
- Specifications: Media
- Specifications: Machine Build and Mechanics
- Assessment of Advertising Claims
- Pertinent Additional Questions in Certain Instances
- General comments
- Advisory
- Acknowledgements

### ***Site-Visit Case Study of Epson 9600 Based on the evolving FLAAR Standards for Evaluating Wide Format Inkjet Printers, new June 2003***

Most sign shops are trying to figure out whether to buy a Mutoh, Roland, Mimaki, Hewlett-Packard, Encad, or ColorSpan. Few sign shops would seriously consider an Epson due to ink costs and slow speed. Yet we found a sign shop that had two Epson printers alongside their solvent ink billboard printer. Were they content with the Epson 9600 and 7600? Or did they wish to jump to a more traditional sign printer?

We were very surprised to learn what this print shop had found out about the Epson. This report is an eye-opener and definitely worth reading, especially if you are an in-house department, work group, graphics design, university, or museum. Obviously sign shops and in-plant print shops will find the unexpected documentation useful as well, for the simple reason that the Epson is the lowest cost printer of its size in the world. We know it does great on photographs? But can it really print signs? And the biggest question is, is the return on investment acceptable?



Professor Hellmuth accomplished here what he is infamous for: going straight to a real-life situation (in this case to a sign shop), and obtaining independent, pithy facts, tips, and help for individuals and companies who are trying to figure out which printer to buy.

#### **Contents**

- General Comments
- Introduction
- Results of the Interview with the sign-shop owner
- Specifications - Printhead
- Specifications - Printhead; Testable aspects
- Specifications: Set-up of the Printer; Tech Support
- Specifications - RIP
- Specifications: Ink
- Specifications - Media
- Specifications: Machine Build and Mechanics
- Assessment of Advertising Claims
- Conclusions
- To obtain license to reproduce
- Please note
- Advisory
- Acknowledgements

## *Agfa GrandSherpa a version of the Mutoh Falcon II for Proofing and POP Signs*

Site-Visit Case Study Review based on FLAAR Standards for evaluating wide format inkjet printers. New August 2003.

This evaluation covers Onyx PosterShop RIP for proofing and signs as well as a thorough discussion of what its like to have a piezo printhead system in a sign shop. The printheads in the Mutoh Falcon II and Agfa printer are more or less the same as in an Epson 10000. This review is based on detailed comments by the owner-operator of a successful prepress and sign printing company. However where as “success stories” blissfully omit the downsides and disappointments, this FLAAR report tells the entire truth of what you can expect in your own facility.



Nicholas Hellmuth at work inspecting wide format inkjet printers in sign shops so he can document the pros and cons of each make and model.



### Contents

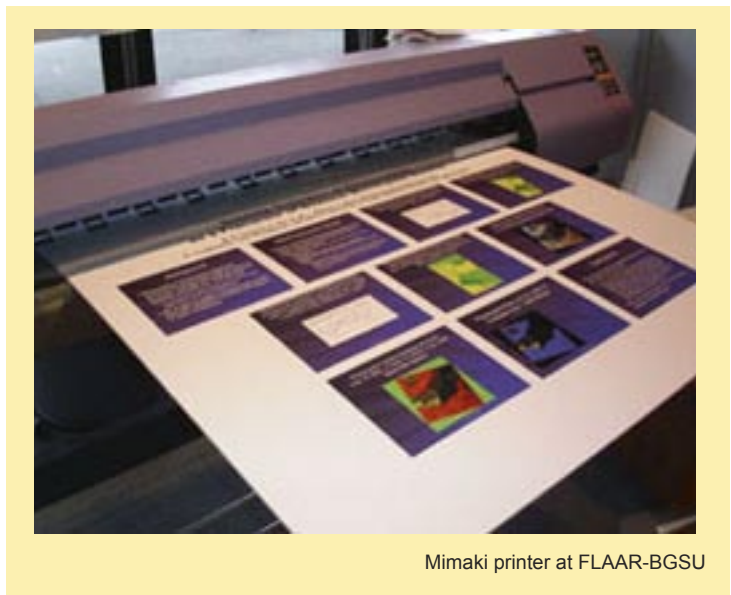
- Introduction
- Initial comments by the print shop owner
- Specifications: Printhead
- Specifications: Printhead; Testable aspects
- Specifications: Set-up of the Printer; Tech Support
- Specifications: RIP
- Specifications: Ink
- Specifications: Media
- Specifications: Machine Build and Mechanics
- Assessment of Advertising Claims
- Comparison with Piezo printers
- Comparison with HP DesignJet
- Conclusions
- Appendix A
- Please note
- To obtain license to reproduce
- Advisory
- Acknowledgements

## Accurate, Reliable, Trusted

The popularity of FLAAR evaluations is based on multiple factors:

1. Our staff undertakes our own evaluations in our own facilities at two universities.
2. We have both piezo and thermal printhead technologies available to compare and contrast.
3. We have 18 inkjet printers, from leading competing companies, plus about 9 RIPs. So we can speak from personal first-hand actual experience.
4. FLAAR added truth-in-advertising standards for evaluating wide format printers. FLAAR is about the only evaluator of wide format inkjet printers who compares the ad claims with the actual real-life output.
5. We have set up fresh truthful standards of excellence for testing inkjet media-ink-color management solutions.
6. This last summer we established standards for evaluating RIP software. The result is accurate, reliable, trusted recommendations.

7. We analyze inkjet hardware and software, inks, media, and color management solutions at the leading trade shows in Germany, England and the USA such as DRUPA, CeBIT, Photokina, Comdex, PMA, PhotoPlus Expo, ISA, SGIA, Seybold San Francisco, IPEX, and others. But we rely on our own experiences or our site-visit Cast Studies for reliable facts about a printer's true performance in real life situations.



Mimaki printer at FLAAR-BGSU

8. We have received twenty-one thousand e-mails from end users. Some of these end-user reports discuss

every detail of what their equipment does well, as well as where the few glitches are. This means we have end-user reports from other photographers as well as from architects, quick print shops, sign shops, pre-press, in-house corporate reprographic facilities, and fine art studios.

9. We do dedicated surveys of end-users to learn what features they like, and dislike, about specific items of hardware, software, cameras, etc.
10. We have correspondents in Europe and Asia to obtain information for us worldwide. We attend leading industry conferences and interview all sides of the spectrum to learn about which printers actually work best. It is impressive how much research by FLAAR staff goes into learning about the insides of the printheads, inks, media, and RIP software.

11. Dr Nicholas Hellmuth is beta tester for BetterLight tri-linear large format photography backs and also for Cruse digital photography systems, a \$97,000 reprographic scanner system from Germany. Thus we have first-hand practical experience in original photography which is used for subsequent inkjet printing. FLAAR is currently testing large format photography equipment in two museums on campus so we understand what a professional photographer seeks when they look for a digital printer. Professor Hellmuth's textbook with 30 chapters covers how to create input for large format printers through digital photography.



Other printers brands and models, with our several RIPs

12. FLAAR covers the entire spectrum, from computers (to run RIP software), to monitors (LCD and CRT). We emphasize need for dual monitors in many applications from CAD to graphics. We review digital imaging software such as Nik.

So people who need to buy entire systems can come to FLAAR and recognize they get evaluations on everything, from PC vs Mac, and in practical format (not fanatical pro one and irrational negative to the other). FLAAR is balanced, honest, and realistic in its recommendations for what equipment corporations and individuals should purchase.

**IF YOU WISH  
TO ACQUIRE THIS SERIES  
GO TO THIS LINK**

<a href="http://www.wide-format-printers.org">www.wide-format-printers.org</a>	<a href="http://www.fineartgicleeprinters.org">www.fineartgicleeprinters.org</a>	<b>CLICK HERE TO VIEW EACH FLAAR NETWORK SITE</b>
<a href="http://www.digital-photography.org">www.digital-photography.org</a>	<a href="http://www.flatbed-scanner-review.org">www.flatbed-scanner-review.org</a>	
<a href="http://www.laser-printer-reviews.org">www.laser-printer-reviews.org</a>	<a href="http://www.cameras-scanners-flaar.org">www.cameras-scanners-flaar.org</a>	<a href="http://www.large-format-printers.org">www.large-format-printers.org</a>
<a href="http://www.FLAAR.org">www.FLAAR.org</a>	<a href="http://www.ctpid.ufm.edu.gt">www.ctpid.ufm.edu.gt</a>	<a href="http://www.wide-format-printers.NET">www.wide-format-printers.NET</a>

Please realize that all reports are in Adobe Acrobat PDF format. The reader software is free from [www.adobe.com/products/acrobat/readstep2.html](http://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.



The now 18 wide format printers of the FLAAR evaluation facilities at Bowling Green State University and FLAAR at Francisco Marroquin University both print signs for the university. This allows us to learn about what it's like to operate a sign shop. In this way we can better help other sign shop owners.

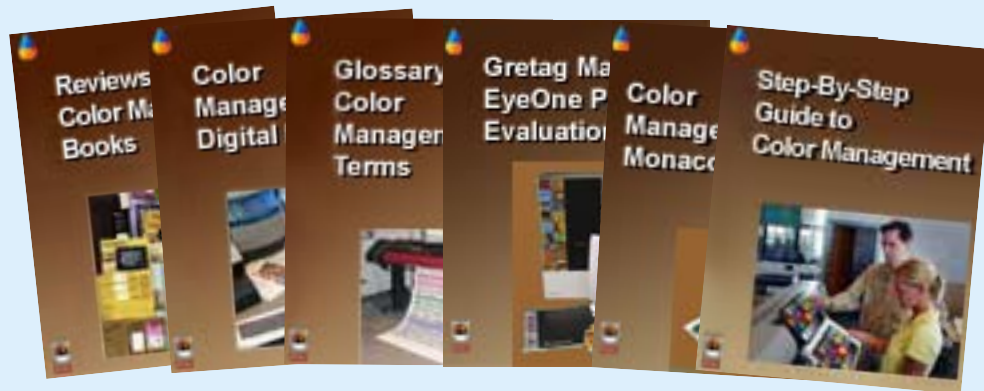
Since FLAAR is effectively an in-plant or in-house print service, we can also assist other in-house printers at other large corporations. After all, a university is like any other large corporation. BGSU has over 19,000 students with faculty and staff in the thousands.

So whether you are an in-house printing area for a workgroup, or an in-plant print shop, or a full-scale sign shop, or printing at home as hobby, second-business or retirement business start-up, the FLAAR Reports on wide format inkjet printers is for you.

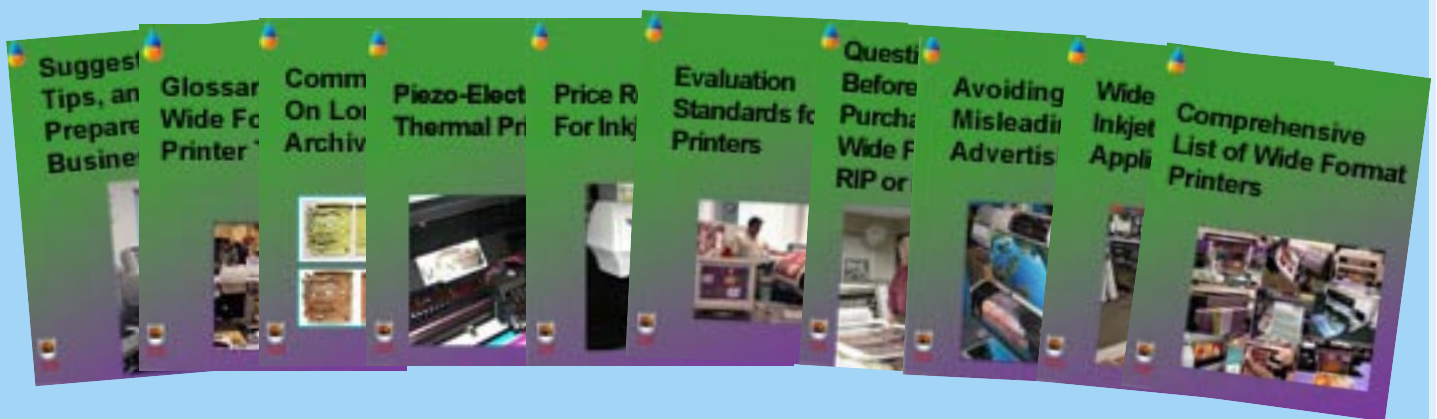
**Acquire these reports at:**

**[www.wide-format-printers.net](http://www.wide-format-printers.net)**

### Color Management Series



### Survival Series



### CAD Series

