

iGen3[®] and iGen4[®]

Finishing Hints and Tips Guide

Supported Printers:
Xerox iGen3[®] Press
Xerox iGen4[®] Press



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Document Version: 2.0 (December 2010)

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Introduction

Much of the output of the Xerox iGen3 and iGen4 is destined for some kind of post-press process, whether the piece is a folded, stapled brochure describing an exciting new product, or a mailing that is expected to arrive intact at its destination.

The purpose of this guide is to help Xerox iGen3 and iGen4 customers achieve the most effective and productive use of iGen3 and iGen4 printed output. This includes finishing and bindery operations as well as other potential post-press processes.

The guide assumes that the reader has a basic understanding of the bindery and of other post-process requirements.

The following points should be kept in mind while using this guide:

- Any planned post-process finishing and end uses such as direct mail or rough handling should be tested with Xerox iGen3 and iGen4 prints prior to making a production commitment.
- Xerox Corporation is not responsible for performance of the third party media or equipment recommended or mentioned in this document or the results obtained from their use.
- Equipment identified for reference sale may not be included in a Xerox contract.

Finishing Guidelines and Recommendations

This section describes the inline and offline finishing operations and devices that Xerox has tested, along with hints and tips that may apply to other makes, models, and processes.

Xerox has not evaluated these products for compliance with environmental, health, or safety regulatory requirements, industry standards, or Xerox standards, and therefore makes no representations of warranty with respect to these products.

Coating and Laminating

As with traditional litho-printed pieces, coating and laminating are excellent ways to improve the durability of Xerox iGen3 and iGen4 output for end uses such as direct mail, transport, or heavy usage. Choosing between coatings and laminating is a tradeoff between cost and the requirements of the piece. In general, laminating is approximately 10 times the cost of coating, but provides much stronger protection.

There are two aspects to validating coating and laminating:

- Find materials that interact well with Xerox iGen3 and iGen4 prints
- Identify equipment to apply the coating or laminate

UV Coating

Xerox has identified coatings that work very well with the iGen3 and iGen4 output on coated stock. Uniform fluid wetting of the sheet is the primary critical parameter to enable quality coated output. This is a challenge as the sheets have a very small amount of silicone release agent on the surface.

Guidelines to attain good wetting performance:

- Offline coating - Printed output should be stored for at least 0.5 hours before coating. Running fluids that have been qualified/developed for inline use with Xerox digital presses can eliminate this duration. Consult your Xerox Sales analyst.
- Nearline coating - Use fluids that have been qualified/developed for inline use. Consult your Xerox Sales Analyst.

- Inline coated sheets - Use fluids that have been qualified/developed for inline use. Most commercially available fluids are not optimized for proper wetting. They may also interact with the fuser agent on the sheets, causing coating integrity or appearance defects. Consult your Xerox sales analyst.

Note: For more information, consult your Xerox sales analyst.

These coatings give the output a very good appearance, as validated by several commercial printers, and protect the dry ink from external environment and usage factors. However, if the finished piece is subjected to cycles of high ($\geq 60^{\circ}\text{C}/140^{\circ}\text{C}$) to low temperatures, the coating may crack.

The paper type does affect the coating performance. Coated, glossy stocks at weights above 140 gsm typically provide the best results. iGen3 output sheets of basis weight 115 to 120 gsm have been UV coated. Note that the book cover applications will require creasing at the folds after coating to minimize cracking of the paper and the image.

Uncoated stocks tend to absorb the coating material and thus not cure completely. The plate or roller used to apply the coating may warp lighter weight stocks.

The following tests were run to characterize coating performance for various job types:

- Appearance – Very positive results from visual inspection. “These are saleable prints.”
- Abrasion resistance – Provides good protection from rubbing and scratching.
- Fold/crack – Xerox iGen3 and iGen4 dry inks will crack on some stocks under certain conditions; lower curling power or a shorter expose time can minimize cracking. Design can eliminate this as a problem.
- Document offset – Resistance to offset is improved with UV coating. However, cracks in the coating were observed at 60° Centigrade (140° F).

The following high performance UV curable coatings have been identified as working as described above with Xerox iGen3 and iGen4 output. They are available from the supplier and are designed for application by gravure or roller coaters on paper substrates.

Supplier	UV Coating	Description
Coatings and Adhesives	5170E	A glossy coating optimized for inline use on digital press output. Please contact your Xerox Sales Representative regarding purchase of this material.
FujiFilm - Hunt Chemicals	Anchor #48001 UV Ultracoat X2 Gloss Anchor #48004 UV Ultracoat X1 Satin Anchor #4840 UV Ultracoat X1 Gloss	A glossy coating optimized for inline use on digital press output. It is also compatible with nearline and offline applications. A satin coating optimized for inline use on digital press output. It is also compatible with Nearline and offline applications. A glossy coating compatible with Nearline and offline applications only. Please contact your Xerox Sales Representative regarding purchase of these materials.
Kelstar International	UV9070 Ultrasheen (For offline coating only)	An ultra gloss clear coating, fast curing, with low viscosity and excellent clarity.

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Sovereign Specialty Chemicals	Mirecure UV1107D (For offline coating only)	An ultra gloss clear coating, fast curing with low viscosity and excellent clarity.
Sun Chemical	Clear coating RCIRV0481635 (For offline coating only) SunCure Clear Coating RC88-1170 (For offline coating only)	A low viscosity coating having a pleasing, shiny appearance with minimal waviness. It works best on stocks at or above 80 gsm covers. A coating commonly used on lithographic prints. It works well on a wider range of stock, but with a more noticeable wavy pattern than the 1635 above. This waviness can be minimized by reducing thickness and with longer leveling time. The inline coating solution also has the ability to use a water-based coating fluid. These fluids are ideal for food packaging and pharmaceutical packages.

Aqueous Coating

The following high performance Aqueous coating has been identified as working as described above with Xerox iGen3 and iGen4 output. The coating is available from the supplier listed and is designed for application by gravure or roller coaters on paper substrates.

Supplier	Aqueous Coating	Description
Coatings and Adhesives	1611E	A glossy coating optimized for inline use on digital press output. Please contact your Xerox Sales Representative regarding purchase of this material.

Laminating

Five laminating materials (films) have been identified as compatible with Xerox iGen3 and iGen4 output:

Manufacturer	Product Description
D&K International www.dkgroup.com	D&K SuperStick Standard Nylon 1.7 mil D&K SuperStick Lite Nylon 1.7 mil D&K SuperStick PET 4/6
GBC www.gbc.com	GBC Digital Lay-Flat Nylon
Transilwrap Corporation www.transilwrap.com	EXB Nylon 1.7 mil

Keys to optimal lamination film-to-paper bond:

- Laminator temperature and speed controls need to be monitored/adjusted/optimized. This is most critical. The goal is to maximize the time under heat. Therefore, we recommend running at the slowest possible production speed of the laminating device.
- Hold the printed material for at least 2 hours before laminating, to allow the fuser agent time to dissipate. The first 10 sheets of the run may have more residual fuser agent.
- Lamination of iGen3-overprinted, offset preprinted shells is not recommended, due to insufficient laminate bond strength.
- Lamination of very high area coverage full bleed images may be problematic near the edges of the substrate and laminate. If possible, design the image to avoid full bleed image near the edge of the laminate.
- Store laminate material in a controlled environment per vendor specifications to prevent laminate performance degradation. Nylon film rolls must be kept wrapped when not in use.
- It is recommended that the media be laminated on the coated side rather than the uncoated side. The fiber structure on the uncoated side prevents the laminate adhesive from penetrating the media surface well and adhering to it.

Booklet Making

The production of saddle-stitched, folded, and possibly trimmed booklets is an important job type for the Xerox iGen3 and the feature set makes it easy to do. Job programming at the front end enables the automatic imposition of pages into signatures with just a few keystrokes using pre-built templates. The system can deliver fully-collated sets ready to be finished into booklets to the stacker. This finishing option is best suited to low page count publications.

Inline Booklet Making

Keys for increased uptime:

- Follow paper storage and loading guidelines in the iGen3 Paper Guide.
- Take advantage of the personality profiles available to optimize system performance for paper size/orientation, and/or booklet page count, and/or SQFBM operations applied.
 - Ask your analyst/CSE to load the profiles for job scenarios that you intend to run.
 - Most importantly, be sure to enable the most appropriate profile for the jobs being run.
- Refer to the associated device's Solutions Planning Guide for further information.
- Maintain the ambient relative humidity between 45 – 55 % RH with paper freshly unwrapped or conditioned for at least 24 hours at this RH level.

Keys to optimized quality

Most tests showed dry ink cracking in the paper fold. This can be avoided by designing the piece so that dry ink is not placed on the fold or minimized by pre-scoring the sheet and laminating or UV coating the cover.

Validated Devices

Consult your Xerox Sales representative to help you select the optimum device that meets your needs.

Offline booklet Makers

Duplo offline Booklet Makers

Both booklet makers listed below are fronted by the DSF-2000 Document Sheet Feeder which can feed pre-collated output from a digital printer to the booklet maker. If needed, a pre-printed color cover can be added to the set at a rate of up to 150 sheets per minute. Setup is automatic and simply requires the operator to load paper and select the desired finishing. The use of optical mark recognition (OMR) technology or bar codes further enhances the process automation.

- **DBM 400 Booklet Maker with the DSF2000 Sheet Feeder and the Series 400T Face Trimmer**
This is a high-speed, highly flexible booklet making system that can produce up to 2,600 booklets per hour across a wide range of paper types, sheet sizes, and weights. Corner, side, and topstitching are also supported.
- **DBM120 Booklet Maker with the DSF 2000 Sheet Feeder and the DBM-120T Face Trimmer**
This automatic-setting booklet maker is designed to complete up to 2,400 sets per hour comprised of 1 – 20 sheets. Corner, side, and topstitching are also supported.

Perfect Binding

Perfect Binding is most often used for larger page counts and is common in textbooks, software documentation, and paperback novels.

Keys to increased uptime are:

- Following paper storage and loading guidelines in the iGen3 and iGen4 Paper Guide.
- Submitting jobs per device Customer Expectations Document (CED) or Solutions Planning Guide (SPG) specifications.
- Maintaining the ambient relative humidity between 45 – 55 % RH with paper freshly unwrapped or conditioned for at least 24 hours at this RH level.
- Simplex sheets printed on iGen3 and iGen4 bind perfectly.
- Choosing media and adhesive carefully since they are the most significant factors in binding performance and combinations exist that allow excellent cover adhesion.
- Avoiding perfect binding of iGen3 and iGen4 overprinted, offset pre-printed shells due to insufficient bond strength.

- Recommended Xerox qualified perfect binding adhesives are as follows:

Manufacturer	Product Description	Offline Finishing	Inline Finishing	Fuser Fluid I Compatible	Xerox Tested (Fuser Fluid I)	Fuser Fluid II Compatible	Xerox Tested (Fuser Fluid II)
U.S. Adhesives www.usadhesive.com	HM 661	X	X	X	Yes**	X	Yes**
Dowell Adhesives www.glue-4u.co.uk	DE 983	X	X	X	Yes**	X	Yes**

**Successful binding is media dependent.

Note: Inline perfect binding using C.P. Bourg BBF2005 with or without BPRFx, BDFx (Bypass).

Inline Perfect Binding

C.P. Bourg BBF2005 with or without BPRFx, BDFx (Bypass):

- Adjust bookmaker back and side pressure to attain a uniform ~ 1 mm thick adhesive bead along the spine and wrapping around the spine by ~ 2-3 mm with no “nail-heading” of the cover. If the adhesive layer thickness is concave (thinner at center versus edges), then the bottom clamp force setting should be increased in single steps until uniform. This should be a repeat of manufacturer’s recommendations.
- When adhesive in the reservoir becomes a dark brown in color, be sure to purge it and refill with fresh material. Follow manufacturer’s recommendations.
- Be sure the book block compiler stops are properly set and that the jogging of the book block gives a uniform result. The operator should inspect the body sheet registration in the book block. The book block should be registered well, like a brick. If some sheets are not seated well in the spine area, they will not be bound well. This can happen more readily with coated stocks, with the correction being to reset the tamper guides in the input station. However, it may also require an adjustment to the jogger that, if not listed in the user manual, would require C.P. Bourg representative assistance.
- Body sheet design
 - Where possible, a 2-3 mm image free gutter at the binding edge will optimize bind force.
 - Note that the BBF2005 will mill/notch off ~ 1 mm from that edge to enable better wetting of adhesive to the body sheets.
- Cover design
 - The inside surface should be free of image, where the cover interfaces to the spine of the book block, plus 2 – 3 mm at front and back edges, to allow for a good adhesive to substrate engagement.
 - Toner in this area will yield a low bind force as the adhesive doesn’t bond well to it.
 - Do not allow image bleed into the spine.
 - Duplex printed covers will result in less cover adhesion than simplex printed covers.
 - Cover adhesion can be maximized by finding the correct substrate/adhesive combination.
- The same image bleed area should be used on the first and last page of the book. Toner in this area will decrease adhesion between the cover and these pages.

- Increasing the pressure applied to the spine, via the stack plate adjustment on the BBF2005 binders, setting the clamp time to 50 % or less, and increasing the clamping pressure to 80 % or g=higher will improve the bind quality.
- Uncoated stock (or C1S for cover) will yield better adhesion characteristics.
- In general, following “best practices” for offset printed materials will produce acceptable binding quality with iGen3 and iGen4 generated prints.
- The image will crack at the cover folds with repeated use of the book. The best way to avoid this is to design the cover image to eliminate image in the cover fold areas if possible. Alternatively, reverse creasing may yield acceptable results.

Offline Perfect Binding

Keys to optimal bind strength:

- Be sure the adhesive is a qualified material and the reservoir temperature is set to the manufacturer’s specifications.
- Adjust bookmaker back and side pressure to attain a uniform ~ 1 mm thick adhesive bead along the spine and wrapping around the spine by ~ 2-3 mm with no “nail-heading” of the cover. If the adhesive layer thickness is concave (thinner at center versus edges), then the bottom clamp force setting should be increased in single steps until uniform. This should be a repeat of manufacturer’s recommendations.
- Optimum settings for iGen3 and iGen4 media are stock plate adjustments of 4 to 6, clamp duration toward the lower end of the scale, and clamp pressure towards the upper end of the scale. Final tuning should be made to achieve the desired book integrity and cosmetic requirements.
- When the adhesive in the reservoir becomes a dark brown in color, be sure to purge it and refill with fresh material. Follow manufacturer’s recommendations.
- Be sure the book block compiler stops are properly set and that the jogging of the book block gives a uniform result. The operator should inspect the body sheet registration in the book block. The book block should be registered well, like a brick. If some sheets are not seated well in the spine area, they will not be bound well. This can happen more readily with coated stocks, with the correction being to reset the tamper guides in the input station. However, it may also require an adjustment to the jogger that, if not listed in the user manual, would require C.P. Bourg representative assistance.
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- Cover design
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 - Toner in this area will yield a low bind force as the adhesive doesn’t bond well to it.
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- Uncoated stock (or C1S for cover) will yield better adhesion characteristics.
- The image will crack at the cover folds with repeated use of the book. The best way to avoid this is to design the cover image to eliminate image in the cover fold areas if possible. Alternatively, reverse creasing may yield acceptable results.

End Use Guidelines

Xerox iGen3 and iGen4 output meets demanding requirements for durability. These requirements are tested using a variety of measurements tools and methods that replicate actual usage.

Waterfastness

No realistic period of complete immersion diminishes the print.

Dry Ink Offset

A common complaint of xerographic output is that the prints offset onto other documents or onto vinyl covers. With iGen3 and iGen4 output there is no reaction in nominal environments. For example, a stack of 80 lb coated prints may experience temperatures as high as 130°F (55°C) without change.

Lightfastness

In accelerated lightfastness testing, Xerox iGen3 and iGen4 prints are exposed to intense radiation that simulates about four years of typical office environment exposure or around two weeks in a south-facing window. Cyan, yellow, and black dry inks are extremely stable and exhibit barely perceptible shifts in color. The magenta dry ink changes somewhat more, with a moderate loss of saturation. This compares favorably with lithographic inks, where magenta, cyan, and black are relatively stable, while yellow fades almost completely away in similar tests.

Durability

For the most part, images will be durable and resistant to erasure. However, scratch resistance can vary by stock used. Depending on the end use, coatings may be needed to improve durability.

Overprinting Guidelines

There are situations where the job workflow may require the Xerox iGen3 and iGen4 output to be used in another print process for overprinting. Results of internal tests to date have shown the following:

- iGen prints cannot be fed successfully through a DocuTech 6180 (and by extension, the rest of the DocuTech family) for overprinting. Results are mottling of the Xerox iGen3 prints or offset of dry inks onto the fuser.
- iGen prints cannot be fed successfully through an HP LaserJet or a Xerox Document Center machine for overprinting. Letterhead printing is therefore not a good job type for the system. Any product with a wax-base fusing system would produce the same results described above.
- iGen3 prints can be successfully overprinted on an inkjet printer, depending on the area coverage of the print and the wetting characteristics of the ink. Wetting issues are most likely when printing over an area of high dry ink coverage. They may be resolved by selecting

a different setting on the inkjet printer to affect the amount of ink printed or the speed of printing.

- iGen prints can be successfully overprinted on a color printer with fusing technologies similar to the Xerox iGen3 and iGen4. Examples of compatible printers are the DocuColor 12, DocuColor 40, and the Xerox Phaser 300 and 800 series products.

Mailing Operations Guidelines

Customers may wish to use Xerox iGen3 and iGen4 pieces for direct mail campaigns. Typical post office equipment includes friction feed mechanisms that may stress the iGen 3 and iGen4 output. Uncoated stocks will perform better than coated stocks. Knowledgeable design and/or coating laminating of the piece can improve results.

Certain postal processing steps may be avoided by following United States Postal Service pre-sort guidelines (<http://www.usps.com/businessmail101>.) If bar coding is to be used, we recommend printing it with the address as part of the variable print job.

In Europe, local postal services should be contacted for mail regulations.

To ensure a successful mailing, especially for a large run, the process should be tested. In the United States, there is no charge for this testing by the USPS.

Contacts

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For Finishing inquiries, please contact your Xerox Service Representative.