Technical white paper

Inkjet Design Mastery

How to prepare for amazing results with digital print and corrugated graphics

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Inkjet Design Mastery

How to prepare for amazing results with digital print and corrugated graphics

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There are a number of processes and considerations involved with designing and preparing files for corrugated packaging applications on HP PageWide Presses. While files prepared for flexo and offset are readily converted to digital-ready form for HP presses, the best practice is to build files designed for digital from the start. This Technical White Paper will help you understand how to do both.

Introduction

The digital transformation in corrugated package printing involves not only converting legacy files—those originally purposed for flexo and offset—to digital, but also the development of files specifically for digital reproduction. To get good results, a number of elements in a legacy PDF file must be modified for an HP PageWide Press. These elements include handling non-printing features, ensuring adequate image resolution, embedding links, aligning and imposing images, and exporting the PDF file with the proper settings.

None of the modifications to transform legacy files to digital are difficult or complex to accomplish, but all must be addressed during file preparation before printing on an HP PageWide Press. Once designers learn how to adapt legacy files to digital printing, it will be obvious how to create files that are purposed for digital from the start. Considerations for preparing new files for digital printing are covered in detail in this paper.

General considerations

The following sections discuss some key differences between printing on HP PageWide Presses and traditional methods. These drive recommendations for preparing files to obtain the best results from digital printing.

Different printing technologies

HP PageWide Presses reproduce color differently than traditional analog and electrophotographic digital presses. They use HP PageWide Thermal Inkjet Printheads and HP Water-Based Inks. Because the printing process and the interactions of water-based inks with paper are unique to inkjet printing, an understanding of the basics of inkjet printing, as well as how HP PageWide Presses reproduce color, is essential to obtaining the best results from your HP PageWide Press.

HP PageWide Presses have six key characteristics differentiating them from other printing technologies:

- HP Thermal Inkjet writing system: Dots are formed from drops of ink ejected from HP Thermal Inkjet Printheads. Drops cross a small gap between a fixed array of printheads—called printbars—and the paper or board, which moves beneath them. The paper and boards run through HP PageWide web and sheet-fed presses is dried in-line after all inks are printed.

- Inks: The physical and chemical interactions of HP Water-Based Inks with paper are different from inks used in offset lithography, liquid electrophotography (HP Indigo), and inks used in competitors' inkjet presses.

- Bonding and Priming Agents: HP PageWide Presses feature liquid pretreatments that enable printing on a wide-variety of standard offset coated and uncoated liners. HP Bonding and Priming Agents are colorless liquids that react with HP Water-Based Inks to control the spread and penetration of pigments on liner to reduce feathering and dot-gain variation across different liners. The use of HP Bonding Agent versus Priming Agents will vary by converter.

  » HP Water-Based Bonding Agent is applied in-press by HP Thermal Inkjet Printheads immediately before printing. The water added by Bonding Agent affects the ink coverage and adds to the required drying energy.

  » HP Water-Based Priming Agent is applied in-line or near-line by a flood coater. The liner is dried before printing (in-line) or rewinding (near-line) by a built-in dryer. Because the water added by Priming Agent is removed prior to printing, HP Priming Agent allows somewhat higher ink coverage than with HP Bonding Agent.

» HP Water-Based Bonding and Priming Agents are neither used together nor on uncoated or coated liners with ColorPRO Technology.   The chemistries integrated into ColorPRO liners perform functions similar to Bonding and Priming Agents.

- CMYK + OV colorants: The pigments used in HP Water-Based Inks have different color characteristics than those used in offset and other printing technologies. For example, a specific set of CMYK values will not produce the same color on an offset press as on an HP PageWide Press. ICC color management or device link profiles convert source CMYK into HP PageWide Press CMKY to reproduce the same color. Settings in the RIP (Raster Image Processor) determine how colors will print that are out of the gamut of the HP press. Spot color inks are not available on HP PageWide Presses.

- Lower ink coverage limits: The % area coverage by HP Water-Based Inks that can be printed for proper runability and effective drying is lower than for offset. Ink limits are automatically set and managed in the press during calibration to produce the maximum saturation without using excessive ink.

- Papers: The dot gain, color and black print density, and feathering performance of aqueous inkjet inks are paper-dependent. HP Water-Based Bonding and Priming Agents can reduce the effect of paper on output quality and allow high-quality results to be produced on low-cost uncoated and coated offset papers. A wide range of papers have been certified for use on HP PageWide Presses.

Unsupported features from offset and flexo

Not only are there fundamental differences in printing technologies between traditional and digital presses, but files originally developed for offset and flexo may make use of features that are neither supported nor necessary in digital print production. The PDF file should be examined throughout the design process to identify and manage these features, or results may not be satisfactory.

Managing unsupported features

Features typically used in traditional print production that are not supported on HP PageWide Presses—and how to manage them—are covered below.

Dielines

Move dielines to a separate layer and ensure dielines swatches are named spot colors.

The order of the layers in the artwork is not important, although keeping the dieline on the top-most layer will ensure that it can been seen (superimposed) above the artwork when its layer is made visible.

Trapping

Remove all trapping adjustments.

Trapping is often used in analog presses to provide margin for registration error between color planes when one ink overprints another. Trapping is neither required nor used in HP PageWide Presses.

Varnish elements

Remove or move all traditional varnish information to a 'Do Not Print' layer.

A varnish plate in an analog press is typically represented in the file as a separate color that overprints over the rest of the artwork. There is no need for varnish information in the job file (or artwork) for an HP PageWide Press. Leaving varnish information in the file could cause the press to print the varnish color and nothing else.

For graphics intended for post-print, please consult with your converter about the necessary varnish elements.

Bump planes

Remove by reassigning (or merging) the bump plane artwork into the original color plane associated with the bump plane.

Bump planes are a second layer of a particular color—usually black—intended to obtain the highest density and saturation for that color. In traditional printing, two plates are created for the bumped color and the image is printed twice.

HP PageWide Presses print color in one-pass, so each color plane is printed once.

Opaque white elements

Opaque white elements should be removed or moved to a separate layer and set to 'Do Not Print'.

For files that are printed on brown kraft paper by flexo and offset, an opaque white is often printed under the color inks for better color reproduction. Opaque white elements are often represented as a unique color in the analog file for the purpose of plate making. If these elements are not removed or moved to a 'Do Not Print' layer, this color may knockout the artwork underneath it.

HP PageWide Presses do not have a white ink, so opaque white elements cannot be printed. The image white-point on HP PageWide Presses is the paper color, so the selection of the hue and brightness of the paper will affect output quality, color gamut, and color accuracy.

Layers

As described above, it is recommended that objects be placed in layers so that their print intent can be controlled throughout the design process and downstream in prepress.

Source color space for offset or flexo files

Files purposed for offset presses typically use a CMYK color space that conforms to a standardized specification. There are many CMYK specifications in use throughout the world. The most common CMYK color spaces for PDF files intended for offset presses are

- Uncoated offset papers: Fogra47 is a European offset specification for uncoated paper (ISO media type 4). Fogra47 is based on the ISO 12647-2 offset color standard. U. S. Web Uncoated v.2 is used in the USA.

- Coated papers: Fogra39 is a European offset specification for coated-dull and coated-gloss paper (ISO media types 1 & 2). Fogra39 is similar to the North American GRACoL specification. U. S. Web Coated (SWOP) v.2 is used in the USA. An Idealliance XCMYK source profile may offer increased saturation on coated packaging papers if the HP-provided options are not acceptable: the gamut on such papers exceed GRACoL in many areas of the gamut. For more information, visit idealliance.org/xcmyk.

For files originally intended for digital printing, HP suggests consistent use of CMYK as the document color mode and sRGB color space as the input color profile for RGB content during file creation and editing throughout the workflow. Using sRGB avoids issues of losing K information through the ICC color management system when the source file contains CMYK objects and images. And, the larger sRGB gamut (compared to offset specifications) can take greater advantage of the gamut of HP PageWide Presses where it exceeds offset specifications.

Designing artwork for digital printing

The following sections provide an overview of considerations for preparing artwork for corrugated packaging applications that will be printed on HP PageWide Presses. These recommendations, organized by topic, apply both to files repurposed to digital from analog printing and for files originally created for digital printing.

Best practices for creating and editing files in CMYK

A CMYK color specification has certain drawbacks because the CMYK color space is device-dependent and relates to a specific set of colorants and paper characteristics. The following recommendations apply both to legacy files and files developed for digital printing.

- Use one CMYK color space consistently throughout the file creation and editing

process.

In the process of content creation, images and graphics will typically come from multiple sources—such as digital photographs, stock artwork, custom logos, etc.—and a number of people may edit and handle the file throughout its journey from creation to print. Image elements may have different color spaces: for example, colors in a digital photograph are typically specified in RGB, Adobe RGB, or sRGB.   For logos and stock graphics, it is important to know which CMYK standard is associated with the element. Image editing programs, such as Photoshop®, typically warn users if color spaces mismatch when an element is added to an image.

A problem for final image quality is that elements conforming to different CMYK standards (coming from different sources and content creators), as well as the composite artwork itself, may be converted into and out of different CMYK color spaces during composition and editing, sometimes by different people and agencies. The set of %CMYK values in one CMYK color space will produce different colors in another, and some colors may be out-of-gamut after conversion. If color conversions made to the file are not documented, there may be no way to know what the original colors were. This can result in problems when the original colors fall outside the limits of the CMYK specification with the smallest gamut. This will result in "flat" or "clipped" image areas—where detail and color saturation are lost—and colors in the shadows may become grainy and have an unwanted gray component. These effects are particularly noticeable in so-called memory colors—flesh tones, grass, sky, food items, etc.—and may cause noticeable hues in what should be neutral tones.

- Know the CMYK color space each element was created in, and convert only once to the CMYK of the target press and paper and evaluate the results with either a soft or hard proof.

- Do not repeatedly convert between different CMYK color spaces or from CMYK to RGB and back to avoid loss of color information near the boundaries of the color gamut. In general, RGB gamuts are larger than CMYK gamuts resulting in clipping when converting from RGB into CMYK. Be aware that digital scanners and digital cameras are RGB devices.

- Recognize that when ICC color management is used to convert from an offset CMYK standard to the CMYK color space of HP PageWide Presses, the effect of setting a gray component replacement (GCR) level in the source file is built-into the CMYK values input to ICC color management.

%K data is not preserved during CMYK-to-CMYK conversions. GCR and %K information are lost because the ICC color management system first converts 4-dimensional source data (CMYK) into 3-dimensional CIE L*a*b* coordinates in the ICC profile connection space, and then converts those L* a* b* values into CMYK (with a specified Rendering Intent) for the HP press.

This also means that a desired GCR level can only be specified by the output ICC profile, since only one CMYK combination for a given Rendering Intent is allowed for each CIE L*a*b* color. Specifying the GCR level—and ink savings—by choosing a mono or color setup option is one of the color management tools available to users of HP PageWide Presses.

Recommendations to suppress banding

Banding may appear as streaks or density variations in uniform area fills across the printed web or sheet. Banding can be caused by drop volume variations across and between printheads.

The following recommendations support the press's ability to suppress visible banding:

- Avoid large areas of saturated color—requiring high ink coverage—unless they add to the value of the product. Avoid large area fills of pure primary colors (CMYK). Consider options for printing with lower density, such as breaking up areas of solid fill with a pattern or replacing it with a high-resolution graphic.

  » The human visual system is very sensitive to white streaks in high-density areas as well as to density variations over a span of 1-2 inches in middle neutral (gray)

tones, so large areas of flat neutral tones should be avoided.

  » Use lower-density, flat tinted area-fills, or use patterned area fills that will produce the same density when viewed at or beyond normal reading distances.

- Avoid saturated gradients made from primary colors (CMYK).
- Replace solid fills with patterns or high-resolution graphics.
- Adding noise can be an effective means of alleviating banding, if solid fills cannot be avoided.

  » Noise can be introduced in the form of a texture (subtle or noticable) or through the noise filter in Adobe Photoshop®.

Recommendations for print density

Large colored backgrounds can add value to the package, but because they increase ink usage and cost, they should be used sparingly. If used, they should not be hidden after product assembly or during typical use—such as on the bottom of a package.

- Avoid color backgrounds in flaps and areas that will be hidden when the box is folded and assembled. Glue targets and other printed areas relevant to assembly and product tracking are not an issue.
- Avoid color backgrounds on the bottom of the box if it is intended to be displayed, stored, and used in the upright position. In many cases, on the bottom, a white background (no ink) with some limited graphics for product identification may be completely satisfactory.
- Avoid the use of large areas of gold and silver coloration. While these colors may be simulated adequately using CMYK inks and a glossy overcoat varnish for text and small graphic features, metallic inks are not available to produce a true metallic reflectivity (i.e., shine).

Areas of saturated solid color should be tested before production to ensure good printability.

When possible, balance the graphics over the frame to manage paper-ink interactions (e.g., shrinkage and expansion) and drying across and along the feed direction. For example, if there is a dark background on the top-left of the frame place a dark image/ graphic on the bottom right relative to the media feed direction.

Printing blacks

When working with a preprint converter, 100% K (i.e., RGB = {0,0,0}) in the source artwork is preferred over any form of rich black, while post-print converters recommend a black build of C40, M40, Y40, K100.

Please consult with your corrugated converter to understand specific best practices for defining black.

Text

Text engages the viewer and invites close scrutiny, especially when reading smaller fonts, so high-quality text is crucial to producing a high-quality product. Sharpness, color fringing and registration, contrast against the background, and the selection of appropriate fonts and sizes all affect the perception of quality and the usability of the package.

For optimal text quality, ensure that text is maintained either as a font or rasterized at 600 ppi. If the text is already rasterized in the PDF file at a resolution below 600 ppi, text quality may degrade due to jagged edges on diagonal strokes and curves.

Ensure that all fonts are fully embedded when the files are prepared for printing on the PageWide Presses.

- Fully embedded fonts can generally be processed by the RIP more efficiently (process once and use many times throughout the PDF).
- Fully-embedded fonts offer greater portability for the PDF file because specific fonts

used in the document do not need to be pre-installed in the RIP to be processed successfully.

- Fully-embedded fonts simplify the handling of the PDF and the setup of the RIP. This directly reduces the likelihood of production errors and increases overall production reliability.

Avoid antialiasing: text may appear blurry if anti-aliasing is used. Turn OFF anti-aliasing when generating fonts or rendering EPS files.

Avoid resizing (scaling) rasterized text. This is especially an issue for bitmap fonts rendered for one resolution and printed at another. Objectionable artifacts may be produced that are not visible in the original. The font should be regenerated for the printing resolution or another (vector) font substituted.

Black text

Black text should be 6 points or larger. *As noted above, please consult with your corrugated converter to understand specific best practices for defining black.*

- Rich black is sometimes used to produce a perceptually-blacker black, but color-to-color misregistration can produce color fringes and will make text characters more sensitive to color misregistration. Using 100% K can also help to reduce overall ink costs.
- Evaluate print samples of small fonts for readability on the intended paper with the intended ICC profile. Carefully examine the rendering of serifs and counters in smaller typefaces for legibility.
- Use knockout not overprint when printing black text against a colored background. Colors are most-likely to bleed in this condition, especially on gloss papers.

Color text

Color text is produced by superimposing dots from different printbars. Color-to-color alignment in the press is critical to color text and fine line quality, and a press calibration should be run before production to ensure colors print in registration.

- Use 6 points or larger for most typefaces to minimize visibility of color misregistration.
- Color text should not have total ink above 200% as shown in the graphics design tool.
- Evaluate print samples of the combination of fonts, sizes, ICC profile, and paper to determine readability. Carefully review rendering of serifs, counters, condensed typefaces, and bold and bold italics that are printed at smaller sizes.

Reverse text

Reverse text is formed from the background color by printing ink surrounding the strokes and inside the counters of characters.   Color bleed and misregistration can affect the readability of small reversed text: counters and thin strokes can be filled in and serifs in some typefaces may disappear. Color-to-color alignment in the press is critical to reverse text and fine line quality, and a press calibration should be run before production to ensure colors print in registration.

- Use 6 points or larger for most typefaces to minimize visibility of color bleed and misregistration.
- For most fonts, reverse only in colors that have total ink coverage of 150% or less to minimize effects of color bleed.
- Evaluate print samples of typeface and size on the target paper with the production ICC profile. Variations in paper may affect clarity of text from run-to-run.

Outlining type

Adobe Illustrator® has a feature where fonts may be converted from bitmap to vector ("outlining"). Type can no longer be edited once this is done, so customers should also send the font files with the artwork files in case text editing becomes necessary. Outlining should only be performed once the content is finalized and no further text editing is needed. The RIP will interpret outlined fonts as vector objects, and this could yield

unexpected results.

Line thickness

- For positive lines, use 0.2pt or 0.07mm or thicker.
- For negative lines, use 0.3pt or 0.1mm or thicker.

Graphic objects

Ideally, graphic objects—such as logos, color text, line art, and graphs—should be represented by vectors. If they are rasterized, the recommended resolution is 600 ppi in order to avoid degradation in output quality due to jagged edges on diagonal edges and curves. In order to preserve resolution and aspect ratio, rasterized objects should have 1:1 pixel aspect ratio and be at full-size (100% scale) for printing.

Unlike offset lithography, HP PageWide Presses do not produce a drop-off in edge quality between solid and halftoned color text and objects.

Additional recommendations for printing graphic objects on HP PageWide Presses include

- Evaluate transparency in objects and eliminate if not required. This will improve processing efficiency in the RIP.
- Do not use Registration: Separation: All. Replace any object tagged with Registration: Separation: All with 100% K. The Digital Front End of HP PageWide Presses does not manage color objects with this setting. This option instructs the DFE to put all such objects on all color planes, which can apply too much ink (up to 400%) onto the web.
- Use knockout not overprint when printing black lines against a colored background. Colors are most-likely to bleed in this condition, especially on gloss papers. Knockout avoids printing color ink on top of black.

Transparencies

Transparencies are such an integral part of Adobe Illustrator® that it's possible to add them without even realizing it. It is important to be aware of transparencies in a file though, as they require computation time which impact RIP speed. Production PDFs should be pre-flighted for transparency and the objects reported as having transparency should be scrutinized for the expected intent. Remove unnecessary transparency by flattening layers where possible.

It is also typical of software (notably Adobe Illustrator®) that if there are any objects with transparency attributes on the page, ALL objects on the page will be enveloped in a "Non-Knockout Transparency Group" even if no objects are interacting with the transparency. This invokes transparency behavior on all objects on the page.

Spot colors that interact with transparency may cause unexpected color shifts. Please see Spot Color section for additional details.

Images

Images with fine details should be printed at least 1-inch (2.5 cm) square or larger. Rasterized corporate logos should be printed at least 0.5 inches (1.3 mm) wide in their narrowest dimension to ensure adequate sharpness and detail.

Color images typically do not have sharp, distinct edges such as those found in color objects, text, and graphics. HP recommends in general that 300 ppi be used for images. However, if file size is not an issue, use 600 ppi for best quality and resolution consistency with text and graphics.   In addition, to preserve resolution and aspect ratio, images should have a 1:1 pixel aspect ratio and be at full-size (i.e., 100% scale) for printing.

Image resolution of 200 ppi is usually sufficient to achieve good image quality. Images with resolutions significantly below 200 ppi will begin to display resolution artifacts. Images with resolution above 200 ppi may not display any noticeable improvement in quality.

Use image formats that compress images as little as possible. This avoids introducing compression artifacts. Lossy compression discards image data that may produce lower

image quality. During file preparation, save images in TIF format to avoid repeated JPEG compressions. When the print-ready file is prepared, saving the file as TIF LZW or JPEG Maximum Quality may produce the best combination of high quality and smaller file size.

RGB images are generally rendered with quality equivalent to or better than CMYK images. With ICC color management, source RGB colors undergo a single transformation to the CMYK colors of the HP PageWide Press, whereas source CMYK colors are transformed twice. In addition RGB images may access areas of the HP PageWide Press gamut that are outside offset CMYK standards.

Color-separated CMYK images may have extraneous black dots visible in the highlights and in light skin tones. Black data below a few percent should be eliminated in images to create higher perceived quality and lower grain. Black data can be removed in Adobe Photoshop® and other graphics composition software by adjusting the tone curves during pre-press file preparation.

Sharpening the image using an unsharp mask filter often produces higher-quality output. Evaluate the printed results of using an unsharp mask filter with different settings in Adobe Photoshop® during file preparation, as high levels of unsharp mask filters can produce or exaggerate artifacts in images and create halo-type effects in contrast areas.

Barcodes

Minimum barcode size: >/= 80% [C-Grade (UPC-A and EAN-13)}

Barcodes should be created and maintained as vectors and not images. If rasterization is required, a resolution of 600 ppi is required.

Black barcodes should should be set as 100% K.

Optimize the bar width reduction (BWR) according to the settings provided by your corrugate converter.

Pantone® colors

Properly-defined Pantone® colors (e.g., Pantone® 485 U) are identified and rendered in a specific manner by the press RIP to generate the closest-possible color match. Since the RIP uses the output ICC profile for a given paper to generate the most appropriate CMYK or CMYKOV rendering, it is critical that the user specify whether the Uncoated or Coated Pantone® Solid color is the desired target color. This designation is not critical in offset lithography, where the same Pantone® ink mixture can be used on either uncoated or coated papers. However, on HP PageWide Presses, the distinction between Uncoated and Coated Pantone® Solid colors can have a significant impact on the result.

In cases where the specified Pantone® color is outside of the gamut of the HP PageWide Press, darker, more saturated colors may be so dark that they reside below the black point of the press, causing them to be rendered as pure black.

Spot colors

For brand colors not defined as a Pantone® swatch, accurate color reproduction is best achieved by defining the color as L*a*b* values.

L*a*b* values specify the color in the Profile Connection Space in the ICC color management system. As such, those values will be transformed into press CMYK values using the output ICC profile and Rendering Intent for the HP PageWide Press and the target paper. LAB based spot colors will yield expected results when not coupled with transparencies or DeviceN color space objects.

Swatches defined as CMYK values are only useful if the user knows exactly what color is reproduced by those CMYK values on the target paper, with specific color setup options and pre-treatment and OPV treatments.

Matching colors

It is recommended you work with your printer/converter to provide samples for accurate color matching of critical brand colors.

Embedding links

Links are most commonly used to specify the images and Adobe Photoshop® elements used in the artwork. In Adobe Illustrator, the user has the capability to "place" an image in the file using a link, as opposed to copying and pasting it in. When so placed, this image appears in the file as a link. As long as it remains a link, the original can be edited in Photoshop, for example, and the artwork will automatically update with the changes. This is a very common practice that allows editing of image elements throughout the design process without having to reimport them into the artwork in Illustrator every time.

Anyone who opens and edits the file throughout the prepress workflow needs access to the links. Usually editing takes place at the agency/prepress house, and in the industry today the design agencies are the only ones who edit the file. So, proper handling of links should not be an issue. However, many Print Service Providers, and even some print customers, are now bringing prepress in-house as part of the digital transformation. This means that a method for sharing links between the design agencies and the in-house prepress services must be put in place. Missing links result in lost information and delays in processing as the file moves through the prepress workflow.

A best practice is to ensure that all links are embedded in the file. The step of embedding links is often overlooked.

Bleed

As bleed requirements generally depend on the diecutting device, use the specifications provided by your printer/converter.

Imposition

File to be submitted should be a 1-up file.

Preparing files for submission to prepress

Native Adobe Illustrator® files

Recommended file settings below:

- Document color mode: CMYK
- Document Raster Effects Setting is 300 dpi

If submitting Adobe Illustrator files, the file must be packaged to included all fonts and links.

PDF file export considerations

It is recommended to use the PDF settings specified by your printer/converter. Some supported PDF settings are listed below:

- Standard: PDF/X-4:2010
- Compatibility: use Acrobat 7 (PDF 1.6) or later, which will give the option to preserve layers within the PDF.
- Compression: No downsampling, no compression
- Output Color Conversion: No Conversion

Unique features of digital print production

HP SmartStream D4D

HP SmartStream D4D (Designer for Designers) is a simple and powerful variable data printing (VDP) tool that enables creatives and HP digital press owners to provide sophisticated, high-value jobs and personalized campaigns. A software plug-in for Adobe Illustrator® that is freely available on Adobe Exchange®, HP SmartStream D4D makes it possible to personalize any job with images, text, and designs for maximum impact.

Within D4D, HP SmartStream Mosaic is variable design software that enables the creation

of one-of-a-kind products. Mosaic automatically generates hundreds, thousands and even millions of unique graphics for variable data jobs, from a fixed base pattern using scaling, transposition, and rotation.

HP SmartStream D4D is intended to help creatives with the design of the VDP files, and to produce sample outputs. It is not intended to be a VDP production tool. Once a VDP design is complete, a packaged file can be exported and transferred to your printer/converter for production output.

Summary

In order to maximize the opportunities created by digital printing technology, designers need to understand how best to build files that take advantage of unique new design possibilites while taking into consideration some of the nuances of the technology. There are a number of processes and considerations involved with designing and preparing files for corrugated packaging applications on HP PageWide Presses. While files prepared for flexo and offset are readily converted to digital-ready form for HP presses, the best practice is to build files designed for digital from the start.

Corrugated packaging files developed for traditional printing may have features that are not supported, nor necessary on HP PageWide Presses. These include dielines, trapping, varnish layers, bump planes, rich blacks, and opaque white layers. The artwork must be modified to eliminate these features before printing on HP presses.

Guidelines for artwork elements, like black build and font sizes, have been provided to ensure optimal printed output. Additionally, it was noted that digital inkjet presses, such as HP PageWide Presses with HP Water-Based Inks, reproduce color differently from traditional printing methods such as flexo and offset. Designers should keep in mind the different methods for color reproduction when selecting colors.

HP PageWide Presses provide designers with the benefits of digital printing, including high image quality, many options to support brand colors, and the ability to version. Once designers become experienced with the unique features and requirements of digital printing on HP PageWide Presses, and implement them properly in print-ready files, they will enable streamlined job production with fewer pre-press and on-press color adjustments.

A quick checklist for designers to use before submitting files

This checklist is a summary of items outlined in the Guidelines, and should help get your file into a "press-ready" state. Please print out and run through this checklist when preparing and saving files.

File Type

- [ ] Adobe Illustrator® (through CC 2020)
  - ○ Document Color Mode is CMYK
  - ○ Document Raster Effects Setting is 300dpi
  - ○ Saved with a profile? Specify: _____
  - ○ File packaged
    - » All fonts are collected
    - » Linked images are collected
- [ ] PDF/X-4:2010
  - ○ PDF 1.6
  - ○ No downsampling, no compression
  - ○ No output conversion, no profiles
    - » Output Intent Profile: Coated GRACoL 2006
- [ ] Low-Resolution PDF for review purposes.

Layout

- [ ] Structure file received from converter to build art (all files submitted should be built with a structure file supplied to you, or the die line file must be supplied when submitting art)
- [ ] Ensure that no art elements are on the die line layer or using die line swatches
- [ ] Logos and other graphics that are vector images are opened, copied, and pasted into art—not placed (to avoid color and font issues later)
- [ ] All graphics and images at edges of structure bleed 1/2 inch past structure
- [ ] Text and logos/graphics inset 1/4 inch from all scores and edges of structure
- [ ] (Recommended) Face panel(s) bleed onto side panels and top flaps 1/8 to 3/16 inch and onto bottom flaps 3/8 inch
- [ ] Bleed graphics onto glue tab 3/8 inch

Color

- [ ] Pantone Spot Colors
  - » As specified in Adobe Illustrator® (no manipulation)
- [ ] Special match colors / brand colors
  - ○ Printed sample to be provided to converter for matching process
- [ ] Rich Black changed to 100% Black or defined as C40 M40 Y40 K100

Images

- [ ] Effective resolution (300 ppi recommended)
- [ ] Images in RGB
- [ ] Sharpen images slightly to increase contrast when printed

Text

- [ ] Text should be left editable as much as possible
  - ○ Special fonts that cannot be shared should be outlined
- [ ] Black text is 6 pt or larger and defined as 100%K or C40 M40 Y40 K100
  - ○ Black text over 8 pt should not be set to overprint
- [ ] Color text does not exceed a total ink coverage of 200% and is 6 pt or larger
- [ ] Reverse text does not have a surrounding ink coverage greater than 150% and is 6 pt or larger

Design for Digital

- [ ] Large solid blocks of color minimized, or patterns added to reduce effects of banding
- [ ] Ink removed from all hidden flaps and glue areas
- [ ] Total ink in color builds should not exceed 240%
- [ ] Evaluate the file for transparencies and flatten where possible
- [ ] Bar codes supplies with .004 BWR; if not:
  - ○ Bar codes need replaced with BWR
- [ ] All identifiers (part number, BMC, etc.) in place