

Printing & Copy Services

FactSheet

Vol. 15, No. 10

Design Basics for Offset Printing

August 2009

Networked Digital Printing versus Offset Printing

Iowa State University Printing Services supports two basic kinds of printing: networked digital printing and offset printing. Networked digital printing is simply printing from your computer to a printer on the network. That printer could be a small laser printer located next to your desk or a large production color or black and white laser printer located in one of our centers. This is the kind of printing that can originate from any computer application you have on your computer.

Offset printing is an ink-on-paper product produced on an offset printing press (schedule a tour of our facility: 294-3601). This kind of printing is more economical for large quantities and is a fairly complex manufacturing process, starting with the prepress or preliminary file processing and proofing step. In order to expedite your print order for this kind of job, it is important to prepare your electronic documents with the proper software tools and a good knowledge of the offset printing process. This document outlines the best practices for preparing an offset print job for Printing Services.

The Right Program

It is important to understand which applications or programs are best suited for particular tasks. We recommend four categories of computer programs for creating a typical electronic publication: a word processing program, an illustration program, a photo manipulation program, and a publication layout or pagination program. The latter is used to actually design and lay out the electronic publication. Most ISU offices use Microsoft Word as the word processing program of choice. Printing Services recommends Adobe Illustrator for illustration applications, Adobe Photoshop for photo manipulation or electronic imaging applications, and Adobe InDesign for publication layout or pagination applications. These latter three applications can be purchased together as Adobe Creative Suites.

Word Processing Programs

Word processing programs should be used to create unformatted content text and should not be used to design complex multicolor publications with graphics and photos for offset printing. These programs do not have certain critical prepress-friendly features needed to produce offset-printed publications. On the other hand, they do

Printing Services Main Plant

Printing and
Publications Building
Kooser Drive
Ames, Iowa
50011-3170
(515) 294-3601

Document Centers

84 Parks Library
294-5218
•
132 Union Drive
Community Center
294-1319
•
0303 Memorial Union
294-1103
•
113 Scheman
294-7691

Design Basics for Offset Printing

have superior tools for creating accurate, spell- and grammar-checked text files that can be imported into a publication-layout program for formatting. When creating text in a word processing program, avoid centering and justifying text. Never put a hard return where it seems a sentence should break. Always let text automatically flow from line to line. Generally, use two hard returns, or one hard return and a tab indent between paragraphs.

Vector Graphics and Illustration Programs

Computers can manipulate basically two kinds of graphics: vector graphics and bitmapped graphics. Vector graphics are best suited for line-art diagrams, logos, and illustrations. Such graphics are defined mathematically as outlines and fills and always print smoothly to Postscript printers regardless of how large they are scaled. Save vector graphics as encapsulated Postscript (EPS) files from Adobe Illustrator and then place or import them into your layout program design.

Bitmapped Graphics and Photo Manipulation Programs

Bitmapped graphics are comprised of a rectangular array of dots or pixels. Scanned or digital photographs are bitmapped graphics. If a digital image is enlarged after being placed in an electronic publication, the pixels become larger. If the enlargement is too much, the image starts to look soft or jagged. Designers should understand image resolution and how it relates to quality offset printing (see Digital Imaging for Print Media Factsheet). Photo manipulation programs, primarily Adobe Photoshop, are used to enhance bitmapped graphics as well as create bitmapped artwork. Bitmapped graphics, such as scanned photographs, should typically be saved as tagged image file format (TIFF) files and then placed or imported into an electronic publication.

Publication-layout Programs

Publication-layout programs bring all the elements created in the other three program types together into a print-ready electronic document. Electronic layout grids can be set up in publication-layout programs. A grid defines finished page size, number of columns, gutter width between columns, margins to the edge of the page, and creates a consistent look throughout the document. When designing booklets, be sure to leave

adequate inside and outside margins for text blocks. This eliminates the chance of having text trimmed off of pages in the binding process. For accurate folds in a folded piece such as a three-column brochure, make sure the gutter width between columns is twice the dimension of the outside margins (see Folding Made Simple Factsheet). If an object in the publication needs to print to the trimmed edge of the printed piece, “bleed” it in the electronic document. In other words, extend it beyond the edge of the electronic document page about 1/8". This 1/8" extension is called the bleed. Always design multiple-page documents in the way that you would read through the printed document, or in “reader spreads.” For example, page one in the electronic document could be the front cover of a booklet; page two, the inside front cover; page three, the facing page to the inside front cover, and so on. When designing a booklet that is to be trimmed or folded to 8½" x 11", set the electronic document page size to 8½" x 11" with backed and facing pages. Set the number of pages to the expected number. Pages can be added and deleted during the design process. Saddle-stitched booklets should be multiples of four pages. Printing Services will then “impose” the electronic document into “printer spreads” before printing.

All text and graphic elements created in other programs should be placed or imported into an electronic page layout, not copied and pasted from other applications. Text can be selected and formatted. Centering, justification, indents, tabs, kerning, font, size, and leading should all be set in the publication-layout program. Digital images and graphic elements can be moved and sized after importing. Designers should include all image, graphic, and font files along with the document file in a single folder when sending files to Printing Services. InDesign allows you to “package” all critical files automatically. Final text edits to an electronic document should always be completed before submitting the job to Printing Services. Major text edits after Printing’s initial prepress proofing stage will create delays and add cost to the job.

Color in Publications

There are basically two “types” of color used in offset printing: spot color and process color. Spot colors are pre-mixed inks and are chosen using standard color guides such as the widely used PANTONE Matching

System. Choosing a PANTONE ink color is similar to choosing house paint. A designer looks at the PANTONE color swatch book and picks a specific color, for example, PANTONE 200 C. The “C” in the specification indicates what this color will look like on coated paper. Press operators use the same swatch book to determine how to mix the ink using standard PANTONE base inks. A typical two-color spot publication may be printed with black ink and one PANTONE-mixed ink.

Designers should define and use colors properly when designing electronic documents. It is best practice to delete all unused colors from the electronic publication’s color palette. Colors can be both defined and imported into the color palette of a document. Generally, color definitions have three parts: color name, color type and color model. There are two major color types, spot and process. There are many models, including CMYK, RGB, HLS, and color libraries. The “PANTONE solid coated” library is the recommended library to select and add spot colors to a color palette. If a vector graphic is created in an illustration program and placed in an electronic publication, all properly defined spot colors used in the graphic will import into the document’s color palette. If a logo or graphic is used often, a good practice is to place it first into a new document. The imported colors can then be used to define the colors of other objects. When designing spot color publications for the offset printing process, accurate color types and color names are most critical. Color names are case and space specific. “PANTONE 200 C,” even though it looks the same on screen, is not the same color as “PANTONE 200 U” or “Pantone 200 C.” “PANTONE 200 C” can also be (mis)defined as process type instead of spot type.

Process color printing is also referred to as four-color or full-color printing. In this kind of printing, all colors are “built” using a combination of tints or percentages of the four process colors: cyan, magenta, yellow, and black (CMYK). All colors, including the PANTONE colors can be simulated with process builds, some more accurately than others. Printing Services has a PANTONE comparison booklet that shows how PANTONE colors look when built out of process colors. All colors in a process color document’s color palette should be defined as process type, although some colors can be converted during

the prepress process. Use process color printing when full-color photos are required in your document. Keep in mind that most scans and digital photos originate in the RGB color space and must be converted, usually in Photoshop, to the CMYK color space before the prepress process. The proper Photoshop color setting is critical to how a CMYK photo will print on press. For more information on this setting, contact Printing Services before converting RGB images to CMYK or specify that you want Printing Services to do the conversion for you. Avoid “building” small type or rules with process builds. The light screens on press will visually break up the text and lines when printed. Use single, solid (100% tint) colors for these elements.

Separations

When Printing Services produces a multicolor offset print job, the first step in the production process is to make separated “plates” from the electronic document. These plates are mounted onto a printing press and ultimately transfer ink to paper. Designers should simulate this separation process before submitting a print job. In the programs mentioned in this document, with the exception of MS Word, it is possible to print separations through the File-Print menu. In these menus, there is a tab or submenu where you can tell the program to print separations and indicate which colors to print, and another tab or submenu where you can tell the program to print printer marks, including crop marks, registration marks, color bars, and document information. When the document is printed to a black and white Postscript laser printer, all objects defined in the electronic document as a single spot color will print as a grayscale image on a laser print with printer marks. This is a separation and is essentially the same as an offset printing plate. If the page design is letter-size and the maximum page size of your laser printer is letter, the document should be printed reduced-to-fit in order to include the printer marks on the test separation. This is also a setting in the File-Print menu. Designers should understand separations and test-separate their electronic documents before ordering their offset print job. It is a good practice to include these test separations as well as a color composite when submitting your job to Printing Services.

Printing & Copy Services

Helping Iowa State Communicate

Main Plant 4-3601 • Copy Centers 4-7072 • www.print.iastate.edu

A Few Keys to Success

- Talk to one of our customer service representatives at the beginning of your design process. We can help you plan a successful document.
- Spending time up front to learn the software will save you time and money in the long run.
- Learn to take advantage of the software tools. For example, using master pages and style sheets in a publication-layout program can help create a consistent-looking publication.
- If you're creating a brochure or publication that folds, make a full-sized folding sample, or "dummy," to test the folds.
- Proofread, proofread, proofread, before submitting your publication for printing.
- Some programs include advanced features that create complex objects. Even though these objects look good on screen, they may not print as desired.
- Don't use illustration programs for page layout, despite the fact that these programs offer tools to do so.

for more information, visit:

www.print.iastate.edu