

Printing Processes

WHAT IS PRINTING?

- Printing is the application of ink to a substrate. In printing, a **SUBSTRATE** is surface material that the ink is applied to i.e. paper, plastic, metal, cardboard, glass, fabric, film, etc.
- In printing, images/documents are separated by individual color whether it is solid color (Spot or Pantone Color) or four color process (CMYK).
Each color is dedicated to one plate, and one plate will always represent one color.
- Every time a plate transfers ink to a substrate, it is considered an **IMPRESSION**.

Printing Processes

- When looking through a printer's loupe you will see either a halftone pattern or solid flat color; in some cases both.
- Halftone pattern consist of one color, and is a series of dots, circles, ovals that make up an image.
- Solid color is just that—solid color. It is a solid area of color, with no dots or patterns.

Printing Processes

There are two types of printing modes in commercial printing.

- **AM SCREENING**; Amplitude Modulated Screening
- **FM SCREENING**; Frequency Modulated Screening

AM SCREENING

Amplitude Modulated (AM) screening is the traditional printing of halftone screens and patterns. The dots are of various sizes and patterns.

When looking through a loupe, the dots are large and very familiar to a comic book image or Lichtenstein painting.



FM SCREENING

Frequency Modulated (FM) Screening prints with dots. Although the dots are of various sizes, there are no patterns. This printing technique has the look and characteristics of continuous tone found in photographs.

When looking through a loupe, the dots are very fine; similar to a painting by Georges Seurat. Sometimes the dots are so small, they are undetectable.



Printing Processes

8 DIFFERENT TYPES OF PRINTING PROCESSES

1. Screen Printing
2. Digital Printing
3. Offset Printing (Offset Lithography Printing)
4. Thermography Printing
5. Flexography Printing
6. Gravure Printing (Rotogravure Printing)
7. Letterpress Printing
8. Engraved Printing

1. SCREEN PRINTING

This technique has a stencil for a plate, which is referred to as a screen. Ink is squeegeed across the surface of the plate/screen and applies to the material below.

Spot colors are only used in this technique.

Commonly used in printing apparel or posters, but also can be found when printing to non-traditional substrates like cardboard.

<https://www.youtube.com/watch?v=8e43Py3r3PA>

2. DIGITAL PRINTING

Digital printing is the printing from basic office equipment, like a laser printer or fax machine. It allows for short print runs, short lead-times, low-inventory levels and storage cost.

Digital printing also allows for personalization in printing, which is a feature most commonly used in direct mail. This feature allows for the accessibility of transferring variable data (names, addresses, and other personal information) from a digital file to the printing press.

The four types of digital printing are:

1. electrophotography
2. Ink jet
3. electro-coagulation
4. direct-imaging presses

Printing Processes

ELECTROPHOTOGRAPHY

Uses a dry or liquid toner most commonly found in plain-paper fax machines, copiers, and some desktop printers.

INK JET

Ink jet sprays the ink in various dots to create a photographic-like image.

ELECTRO-COAGULATION (ELCOGRAPHY)

Electro-coagulation, or elcography, is when electric signals are used in printing, through electric-sensitive ink that thickens to create an image.

DIRECT-IMAGING PRESSES (WATERLESS OFFSET)

Direct-imaging presses, or waterless offset, is similar to offset printing but without the water.

3. OFFSET PRINTING: (OFFSET LITHOGRAPHY PRINTING)

The printing process where a thin metal plate bears the impression of the printable image. This area remains dry to accept oil-based ink; the non-image area accepts waters. Because oil and water do not mix, this allows the printable area to only accept the oil-based ink and the non-printable area to only accept water.

The metal plate is so thin, that it wraps around a cylinder. It never touches the actual paper, but applies the image to a rubber blanket which transfers to the paper on the press.

Since one plate can only accept one color, and there is one plate for each color in a job, there can only be one cylinder for each plate and color.

This is the most commonly used process of printing.

OFFSET CONT.

The press can vary from a small one-color press that can comfortably fit in a small closet, to a large press that is the size of a basketball court.

There are two different types of printers that are considered offset: sheet-fed and web press.

SHEET-FED is a press that accepts individual sheets. Very similar to how a desktop printer would accept paper. This is best used for small print runs, like a 3-panel brochure with a quantity of 150.

WEB PRESS accepts rolls of paper. It also requires a large print run, in order to be cost-effective, like a 32-page brochure with the quantity of 100,000. Magazines, newspapers and catalogs are commonly printed using this technique because of these factors.

<https://www.youtube.com/watch?v=XUIBueqStg4>

4. THERMOGRAPHY PRINTING

This is a form of offset printing, where an extension is added to the offset press.

The job would print just like a normal offset print job, through the offset press but then it is run through a thermography extension.

In the extension, powder-like granules are blown onto the paper adhering to only the wet inked surfaces. While the residue is vacuumed up into a reservoir; heat is then applied to the page. The granules melt and fuses with the ink, causing it to raise and have a bit of a sheen.

This printing technique was a very popular style used in printing business cards. This technique can be found used for aesthetics purposes of a design to add texture to the ink.

5. FLEXOGRAPHY PRINTING

Also called surface printing.

This is offset printing but is used for printing packaging and printing to non-traditional substrates; i.e. plastics, foils, and any other material that doesn't use cotton or wood fibers.

6. GRAVURE (ROTOGRAVURE) PRINTING

This process requires that the cylinder of the press be engraved with the printable areas and then filled with ink to apply to paper. Traditionally the cylinder was chemically etched and then dipped into an acid bath.

Today, the images are scanned and then diamond-etched onto the cylinder.

This technique is not used too often because of printing cost.

Gravure printing is more refined, precise, and can print at a higher density with near-perfect registration.

7. LETTERPRESS PRINTING

This is relief printing that applies ink to the page by applying pressure. The printing plate is either metal (ex. lead), photopolymer, or wood.

8. ENGRAVED PRINTING

The plate is a metal die with male and female counters. Ink is applied to the female counter and pressure is applied to transfer ink to paper. Engraved printing is slightly chalky and end-user can feel the raised surface of the printed area.

LETTERPRESS VS. ENGRAVED PRINTING:

Letterpress creates an impression into the paper. Engraved impression is a raised surface.

5 SPECIALTY PRINTING TECHNIQUES

1. Die-Cut
2. Laser Die-Cut
3. Embossing
4. Debossing
5. Foil Stamping

All five of these techniques uses a die. A Die is a metal device used for cutting or forming a shape in a substrate. The die is the mold of a shape/graphic that is used to cut paper.

Although these techniques may seem expensive, it mainly depends on the die to determine the cost.

For example, using an existing die that a printer or the die vendor has in stock, is cheaper than creating a new die.

DIE-CUT

A technique that cuts paper. The cut can be as simple, like a slit in a folder that holds a business card; a simple shape; or something complex like an image.

This technique is often used two ways in printing. One, as a window-effect in printing, whereas a shape is cut into the paper and that shape creates a window to show imagery or text from another page. Second, as a means to contain or hold elements within a publication, like a business card.

LASER DIE-CUT

Unlike a normal die-cut, a laser die-cut uses a laser to cut paper instead of a metal die. This technique is normally used for aesthetic purposes in design. Instead of cutting out one shape, it is used to cut out many very fine shapes, that normally create an image.

EMBOSSING

A technique that uses pressure and heat to **RAISE** an image above the level of the paper.

This technique can be applied with or without a printed image. Without a printed image, using no ink, it is called **BLIND EMBOSSING**; with a printed image it is called **REGISTERED EMBOSS**.

DEBOSSING

A technique that uses pressure and heat to **LOWER** an image below the level of the paper. This technique can be applied with or without a printed image. Without a printed image, using no ink, it is called **BLIND DEBOSSING**; with a printed image it is called **REGISTERED DEBOSS**.

FOIL STAMPING

in foil stamping, heat and pressure is applied to a roll of mylar foil, which adheres to the substrate.

This process is a great way to apply solid color to a dark-colored substrate, without compromising the color of the foil.

INDICATING SPECIALTY PRINTING ON THE SPEC SHEET AND IN THE DIGITAL FILE.

When using a specialty printing technique, it should be indicated under the **SPECIAL CATEGORY** of the spec sheet.

When using a foil stamp it should not only be indicated in the **SPECIAL** category, but also the **COLORS** category.

In the digital file, all techniques should be indicated with a spot color that is not already being used in the document and is in no relation to the color scheme. This spot color should be identified in the special category of the spec sheet; i.e. Special: Die-cut on cover 1 indicated in PMS 299.

Tip: It is always best to use a spot color, but to clarify things in a design job, when a job is nothing but spot colors use Magenta, a known process color; when a job is all process color use a spot color. This technique will draw a red flag to the color because it is not suppose to be there.

