

PAPER CHARACTERISTICS

Know the Lingo to Choose the Right Paper

The type of paper used for a printed project is called stock or **substrate**. Paper is available in a variety of textures, coatings, finishes, weights, caliper and grades. The choice of stock is determined by a number of factors. The most important are quality, color, opacity, weight, caliper, availability and cost, but not necessarily in that order.

Paper texture, or the **smoothness** of a paper, is not very important in web offset printing. Some papers are very smooth, while some are very rough. Paper is available from both extremes and everywhere in between. Smoothness is measured to the thousandths of an inch, and the differences are often not detectable without a magnifying glass. Smoothness greatly affects solids and halftones, which is why it is more important to letterpress and gravure operations. As smoothness decreases, solids and halftones become rough in appearance.

Finish is greatly related to the smoothness of paper. To affect finish, paper can be uncalendered, **calendered**, or supercalendered. The usual finishes of uncoated stock are, in order of increasing smoothness: antique, eggshell, vellum, smooth and luster. To achieve some finishes, paper is embossed after it leaves the manufacturing machine. Common papers that require embossing are linen, tweed and pebble finished. After finishing, a paper can be coated to further affect the finish and smoothness.

Coating refers to whether a paper is coated or not and, if so, its type. Uncoated paper does not have an outer coating. Uncoated paper is manufactured in a wide variety of finishes, colors, and weights, and offers the versatility needed to meet the practical demands of most print jobs. Various uncoated stocks include book, cover, offset, text and vellum. NPC prints mostly on uncoated paper.

Coated paper has an outer layer applied to one or both sides. The coating may be added while the paper is moving through the papermaking machine or after it comes from the machine. Coated stocks are available in a variety of finishes such as gloss, dull and matte. They are also available coated on one side only.

Coated stock tends to have good ink **holdout** and minimal **dot gain**, which are especially important for creating sharp, bright images, black and white halftones, and four-color process images. The smooth surface of coated papers also helps to reflect light evenly. Coated stocks tend to be used more for eye-catching materials, not books and forms that have a shorter shelf life and practical application.

The amount of light reflected from the surface of a piece of paper is referred to as **brightness**. For white stock, the sheet must reflect all wavelengths of light in the visible spectrum at the high level.

"Blue" or "cold" white describes papers that reflect a higher percentage of light in the blue/violet region. "Warm" whites have higher light reflection in the red or orange region of the spectrum. When you see a number associated with brightness, it is the percentage of light reflected in the blue/violet range. Most white papers are within the 60 - 96 brightness range. The higher the brightness, the more blue colors will most likely look on the paper compared to less bright papers. Uncoated papers and coated papers both have a brightness characteristic.

Opacity is a term used to describe how much light penetrates through a sheet of paper. Less light traveling through the paper equates to a paper that is manufactured with more fibers, which allows fewer images to show through on the opposite side of the sheet. The higher the opacity, the lower the amount of light that can penetrate through the paper. Opacity is increased by adding mineral content to the paper or by adding caliper.

Caliper is the thickness of the paper and is measured in thousandths of an inch. Caliper is very important in book printing, as it is used to determine the final thickness of the book, but it is often referred to as **bulk**. Bulk is measured in pages per inch (ppi) for any given basis weight.

The **basis weight** of a particular stock is the weight, in pounds, of one **ream** (500 sheets) of paper cut to its **basic size**. For example, "110# Index" means that a ream of this paper weighs 110 pounds. Note below the basic sizes for a number of stocks. Sizes are determined by paper **grade**.

<i>Grade</i>	<i>Basic Size</i>
Coated, Offset, Book, Text	25 x 38 inches (635 x 965 mm)
Cover	20 x 26 inches (508 x 660 mm)
Bond, Writing	17 x 22 inches (432 x 559 mm)
Newsprint, Tag	24 x 36 inches (610 x 914 mm)
Bristol	22 ½ x 28 ½ inches (572 x 724 mm)
Index	25 ½ x 30 ½ inches (648 x 775 mm)