

## Paper demystified.

# Specifying Paper

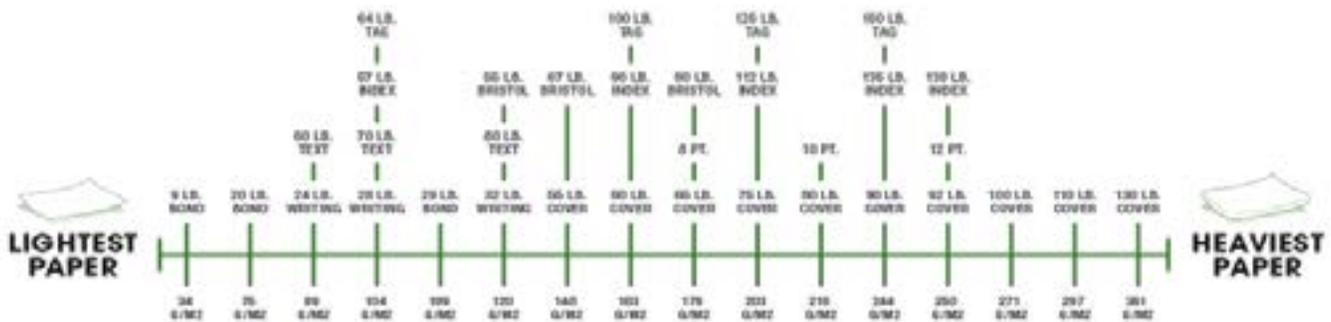
Bond. Card Stock. 14pt. Coated. Cover weight. Text weight. Brightness. Specifying paper can be pretty confusing. There's a whole lot going on, and even folks who have procured paper and printing for a long time don't always understand all of the characteristics. We've prepared this primer for those who want to dig in a little deeper. Of course, we think the BEST way to select a paper is to call us, describe your project, budget and goals and let us make some recommendations!

### Paper Classifications

The names that we use to refer to papers – bond, book, offset, text, writing, cover, coated, index bristol, label, tag – are very descriptive since they suggest what the paper is used for. For example, bond paper was originally used for printing bonds and legal documents; book paper was used for the interior pages of books; and tag was used to manufacture tags. Because each type of paper had a designated use, each was manufactured with properties specific to that use.

### Paper Weight

In Europe, paper weight is specified by Grams per Square Meter, or "GSM." The higher the number the heavier, and usually thicker, the paper is. Alas here in the US we use a different system where each paper is weighed according to the size of a number of sheets at a certain size of each classification. So 28 pound bond is about the same "thickness" as 80 pound book. And 65 pound index is pretty darn close to 100 pound book. Here's a little chart that attempts to sort it out.



### Paper Coatings

When paper has a coating applied, the surface becomes smooth and glossy and the sheet has a higher opacity. A coating improves the appearance of photographs and screen tints with sharper definition, improved density and better color fidelity than can be obtained on uncoated papers.

*Coated paper* differs in degrees of gloss (the degree of light reflected from the surface of the paper). Matte has a glare-free surface and is the least glossy; dull has sheen rather than a shine; gloss is shiny with a high degree of light reflectance; cast coated is a highly polished, mirror-like surface.

Paper may be coated on one side (C1S) or two (C2S), either during the paper-making process or on independent coaters. Coatings are made from clay and other materials and are applied by rolls, air knives or trailing blades.

*Uncoated paper* may have surface sizing added. This treatment makes the paper resist penetration by water or other liquids and provides surface strength. This prevents feathering (uneven ink absorption) and picking (lifting the paper surface during printing).



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## **Paper Finishes**

A paper's finish describes its surface smoothness. The finishes given to uncoated papers, in order of increasing smoothness, are antique, eggshell, vellum, wove, smooth and lustre. The smoother the paper, the less ink will show through.

Another smoothing process is known as calendaring. It is accomplished when the paper passes between a set or stack of horizontal cast-iron rolls at the end of the papermaking machine. The calender stack controls the caliper (thickness) of the paper as well as its smoothness and gloss. If the paper goes through a second calendaring process, it has been supercalendered. Both coated and uncoated paper can be supercalendered.

Paper has two sides, each with different characteristics. The side that is against the wire of the papermaking machine is called the wire side. The other (top) side is the felt side, named because it contacts a felt belt. Paper that has been formed but is still about 50% water goes through a pressing process supported by the felt belt. If the belt has a textured marking felt, it will impart a texture to the paper.

Some finishes are embossed on the paper after it has left the papermaking machine. The paper passes through a rotary embosser, dry and under pressure. Linen is a common embossing pattern.

## **Paper Marks**

Paper marks are made in the paper during the wet portion of the manufacturing process. A dandy roll rides on top of a moving web of paper to remove water and to lay down and compact paper pulp fibers. If a wire design is added to the surface of the dandy roll, it will affect the fibers and produce a watermark. The watermark may be the familiar laid watermark; the name of the paper; or a company name.

## **Paper Properties**

*Formation* is the distribution of fibers and filler in a sheet of paper. The more uniform the distribution, the better the formation and the higher quality the paper. To test formation, back light a sheet of paper. Blotches (called mottle) will appear where fibers are dense; light areas indicate more filler. The greater the mottle, the poorer the formation and sheet quality. Formation is especially important when printing photographs and screens.

*Opacity* is the ability of the paper to obstruct light from passing through. Cellulose fibers (the main ingredient in paper) are transparent. Paper with more fibers or fillers absorb and diffuse light as it passes through the paper. The less light that passes through the paper, the greater the opacity and the less second side printing will show through to the first side. Opacity is measured on a scale of 1 to 100; the higher the number, the more opaque the sheet.

Guidelines for selecting an opaque sheet: Thick is more opaque than thin; Rough is more opaque than smooth; Coated is more opaque than uncoated; Dark is more opaque than light.

*Brightness* is a measure of a paper's ability to reflect light and is rated on a scale of 1 to 100. The more light the paper reflects, the more specific light waves will be absorbed by the ink and the truer the color will appear. The ability of the human eye to assess brightness is compromised by such factors as the color (shade) of the paper and its gloss. A balanced white sheet reflects all colors equally and will reproduce color accurately. A white sheet that reflects more blue than red and yellow will appear to have a cool tinge and make colors appear brighter. A white sheet that reflects more red and yellow than blue will have a warm tinge and make colors appear clearer and stronger.

*Grain* describes the direction that the paper will run in a press relative to the direction it was manufactured. "Grain Long" means that the grain is parallel to the long dimension of a sheet. "Grain Short" means the grain is parallel to the shorter dimension of the sheet. This is an important factor when it comes time to fold your project. Paper folds best when it is folded parallel to the grain.