

Making Paper Choices

Choosing the right paper is an art. A good paper choice often makes the difference between a so-so project and a memorable end product. Essentially, paper is just one piece of the job, but it is the one part that interacts with every other design and production element – from ink to bindery. If the right choice is made, then color, texture, and paperweight will support and amplify the concept and design.

Questions you should ask yourself before making your paper selection. Ask these questions at the start of the project.

- Is this for sales, education, product display, self-promotion, direct mail?
- Will this be saved, mailed back, circulated or thrown away?
- Is this a part of a series or will it stand on its own?
- Will it be folded or flat?
- Do I want to print on coated, uncoated, all white or utilize color?
- Will this be printed 4 color process, duotones, line art or with special printing techniques?
- Do I need a specific type of paper for durability? Water or tear resistance?
- What is my quantity?
- What is my budget?
- Will the job require a matching or mailing envelope?

Olmsted-Kirk: The Paper Merchant

Printing papers are stocked and distributed by paper merchants. As a service to designers, printers and other paper specifiers, we also supply a variety of reference materials that are practically indispensable when choosing and specifying paper. These materials include swatchbooks, sample sheets, blank dummies, envelopes and a variety of printed samples that demonstrate graphic printing techniques and formats.

- **SWATCHBOOKS:** The most convenient way to begin to look at any paper is with the swatchbook. This helpful planning tool includes samples of the paper, references available weights, colors and finishes. It also lists sheet sizes and other paper information that are important in matching a paper to the requirements of a project. Swatchbooks are often helpful when discussing the choice of paper with a client.
- **SAMPLE SHEETS:** As a specifier nears a decision point on the paper to be used, a paper merchant can supply another valuable aid – sample sheets. They are usually stocked in a sample size which is 12 ½ x 19. This size can be cut and assembled to approximate most projects. They are often used for testing folding properties, for considering a variety of papers in different combinations, and for making dummies. They can also be utilized for “draw-downs” where the printer will actually put ink on paper to see how it interacts and reproduces on a texture or color.
- **PRINTED SAMPLES:** Printed samples are available from paper manufacturers through the paper merchant. Printed samples offer a look at how a paper responds to a variety of printing techniques. Although the available samples may not feature an exact match to the desired technique or paper feature, they usually provide a good enough reference for an accurate appraisal. Printed samples are often educational.
- **PAPER DUMMIES:** The best way to appraise the overall appearance of a paper or combination of papers chosen for a project is with a blank paper format dummy. When made to the exact size and format of the project, the blank dummy provides an accurate way to approximate the look and feel of the finished project prior to printing. Bulk, weight, visual, and tactile quality can be easily assessed. To request a dummy, you will need to provide size, format, style and paper specifications for your project. Or you can create the dummy yourself with supplied samples sheets.

Opacity

Opacity is a critical physical characteristic of paper. It refers to the ability of a sheet of paper to prevent printed ink "show through" from the reverse side or from an adjoining sheet. The lower the basis weight, the harder it is to maintain opacity.

OPA CITY CHART GUIDE

To see the opacity of different sheets of paper, place this chart behind an unprinted page. Use this to help compare sheets in the same and different basis weights.

Understanding Paperweight

Understanding paperweights can be difficult. Trust us, we know. There are many questions. You may ask, how can there be a 80 lb. text **and** a 80 lb. cover? How is a 28 lb. writing equivalent in weight to a 70 lb. text? It's all related to the basic manufacturing size – called the “*basic size*”. Even though you buy papers in various sheet sizes, each of these different categories of paper (e.g. bond, writing, text, cover, index and tag) – all have a basic manufacturing size. And these basic manufacturing sizes are related to the presses or the uses that these different types of paper were originally created for. This is why you can have equivalent weights in various types of papers.

Let's try to simplify it. Take a look at the chart below. We've added in the GSM (grams per square meter) as a reference point because g/m² is a universal measure of paper. GSM is the definitive weight of a single sheet of paper. This list is by no means all the weights of paper available but it references a range of commonly used weights. Please use it only as a general reference document* to understand paperweight.

GSM	Weight	Description
74gsm	20 lb. Bond or Writing / 50 lb. Text	<ul style="list-style-type: none"> • Common paper weight found in your copier machine • 50 lb. text commonly utilized multi-folded instruction pamphlets
89gsm	24 lb. Bond or Writing / 60 lb. Text	<ul style="list-style-type: none"> • Most popular letterhead or stationery weight • 60 lb. text utilized for catalogs with large page counts and envelopes
104gsm	28 lb. Writing / 70 lb. Text	<ul style="list-style-type: none"> • Great weight for inside pages of a brochure • Better opacity for two-sided, text page printing with little “show-through”
118gsm	32 lb. Writing / 80 lb. Text	<ul style="list-style-type: none"> • Slightly heavier than 28/70 and even less “show-through” • An even better choice for two-sided printing and brochures
145gsm	67 lb. Vellum Bristol	<ul style="list-style-type: none"> • Lightweight card stock used for door hangers, filing, indexing and mailing
148gsm	100 lb. Text	<ul style="list-style-type: none"> • Great for text pages with super heavy ink/color coverage when your job requires no show-through on your text pages
165gsm	90 lb. Index	<ul style="list-style-type: none"> • A durable, economical card stock with a smooth, hard surface for index tabs, business reply and other applications
176gsm	65 lb. Cover	<ul style="list-style-type: none"> • Lightest cover weight paper in the text and cover category of papers
200gsm	110 lb. Index	<ul style="list-style-type: none"> • The average weight of an index card. Both 90 and 110 lb. index are common weights used for tabs, dividers and manilla folders.
216gsm	80 lb. Cover	<ul style="list-style-type: none"> • Most utilized cover stock weight in text and cover papers. • Available in a variety of finishes and textures.
255gsm	140 lb. Index	<ul style="list-style-type: none"> • Super, heavy-weight applications for tabs, dividers, and manilla folders
270gsm	100 lb. Cover	<ul style="list-style-type: none"> • A heavier, commonly used cover weight paper • Popular for company branded materials, folders, and posters
297gsm	110 lb. Cover	<ul style="list-style-type: none"> • A heavy cover weight in between 100 and 120. Usually single ply.
324gsm	120 lb. Cover	<ul style="list-style-type: none"> • Heavier cover weight paper • Availability in a duplex with two different sheet colors on each side
352gsm	130 lb. Cover	<ul style="list-style-type: none"> • Ditto to above weight • Even heavier cover weight utilized for packaging and company materials
380gsm	140 lb. Cover	<ul style="list-style-type: none"> • Yep, even heavier for packaging, hang tags and printed materials
446gsm	165 lb. Cover	<ul style="list-style-type: none"> • Yes, it's crazy but fabulous – this weight is even heavier and super thick • Use this for your business card if you really want to impress someone.

Please remember that the greater the “lb” associated with a paper doesn't always determine that it is a “thicker” sheet. Notice that the 67lb Vellum Bristol has a lower gsm than a 65lb cover because they are in two different categories of paper and their “basic size” to determine weight is different.

**The Values in the table below are intended to serve as a guide only. They should not be used as specifications because there are variances within the same basis weight due to other characteristics of the papers. Similar weight papers may vary slightly between different paper manufacturers.*

Envelopes

Envelopes are manufactured in a large variety of sizes and shapes. Standard sizes of envelopes are an important consideration if the project you are designing or printing is to be mailed. Save time and money by using standard sizes. Custom envelopes are available but this process requires time and a custom die which is an additional cost.

Basic Style Constructions

Most all envelopes are manufactured from two basic constructions. They are either open side or open end.

OPEN END ENVELOPES have the **opening flap on the short dimension.**

OPEN SIDE ENVELOPES have the **opening flap on the long dimension.**

Window Envelopes

Windows are generally parallel to the seal flap. Custom window shapes can be made.

To ensure an accurate quote on a special window, it is advisable to scan the existing envelope or email a detailed drawing with size, position, window material and shape.

Measuring a Window

- Always measure a window envelope with the flap at the top
- Window size is always given in inches – with height first, then width
- Position of the window is given with inch measurements
 - First, position from left folded edge to the left edge of the window (position from left fold)*
 - Secondly, position of bottom of window to bottom fold (position from bottom fold)*

Note: A commercial flap envelope with a standard window has a 1.125 x 4.5 inch rectangular window with rounded corners. It is positioned .875 inches from the left fold and .5 inches from the bottom fold.

WINDOW MATERIAL

POLY- The most popular and inexpensive material. Resistant to humidity but will melt in high-heat.

CLEAR- Completely transparent. Cannot withstand heat.

OPEN FACE- Also called OPEN PANEL. This window has no material added. It is an “open, die-cut” window.

SPECIAL- Environmental window material is available by special order.

GLASSINE- Lacks clarity and does not do well in humid conditions. Safe for high heat and recyclable.

HEAT RESISTANT- Recommended material for thermography and digital printing.

TYPES OF ENVELOPES

- Commercial Flap
- Square Flap
- A-Style Announcement
- Baronial
- Square *(require a surcharge to mail)*
- Booklet
- Catalog
- Policy / Coin
- Remittance

[Standard Envelope Size Charts for each type of envelope on following pages](#)

Glossary of Paper Terms

Acid Free (Neutral pH)- Acid-free papers are manufactured in an alkaline environment, which prevents the internal chemical deterioration of the paper over time. The addition of calcium carbonate as a buffer also makes the paper resistant to the effects of an external acidic environment.

Alternative Energy- Energy sources that are not based on the burning of fossil fuels or the splitting of atoms. For example, solar energy, wind power, wave power, and hydroelectricity.

Aqueous Coating- Water-based coating applied like ink by a printing press to protect and enhance the printing underneath. An aqueous coating usually gives a gloss, dull, or matte finish and helps prevent the ink from rubbing off.

Archival Paper- Paper that is alkaline and will not deteriorate over time. Archival papers must meet national standards for permanence. They must be acid-free and alkaline with a pH of 7.5 to 8.5; include 2% calcium carbonate as an alkaline reserve; and not contain any groundwood or unbleached wood fiber.

A-style Envelope- Announcement style, open side envelope with double side seam construction and a square flap.

Baronial Envelope- Mostly used for announcements and greeting cards, this envelope style has a large pointed flap and diagonal seams.

Basic Size- The standard sheet size used to establish the basis weight of a ream (500 sheets) of a given grade of paper. Basic size vary by grade: Book is 25" x 38" while Cover is 20" x 26".

Basis Weight- Weighing 500 sheets of any grade of paper in its standard basic size will determine its basis weight. In other words, 500 sheets of 17 x 22, 24-pound bond will weigh 24 pounds. The standard basic size for writing papers is 17 x 22, text is 25 x 38, and cover is 20 x 26.

Bleaching- The process of chemically treating pulp fibers to reduce or remove coloring matter so that the pulp is improved in terms of whiteness or brightness.

Blotter Paper- An unsized paper used wherever absorption is the required. It is often made from rag, cotton linters, wood pulp, or mixtures of these. Some grades are made with a smooth machine finish, which makes them printable.

Bond- Originally a term applied to cotton-content paper used for printing bonds and legal documents, and distinguished by strength, performance, and durability. Bond paper may now be made from either cotton, chemical wood pulp, or a combination of the two. Today, writing, digital, and cut-size papers are often identified with the bond name.

Book- General term for papers suitable for the graphic arts; may be coated or uncoated. Equivalent in weight to text papers.

Booklet Envelope- An open sided envelope which seals on the long side.

Broke- Paper that has been discarded anywhere in the process of manufacture. "Wet broke" is paper taken off the wet press of a paper machine; "dry broke" is made when paper is spoiled in going over the dryers or through the calender, trimmed off in the rewinding of rolls, trimmed from sheets being prepared for shipping, or discarded for manufacturing defects. It is usually returned to papermaking process.

Brightness- Brightness is measured as the percentage of light in a narrow spectral range reflected from the surface of a sheet of paper. It is not necessarily related to color or whiteness. A paper with a brightness of 98 is an extremely bright sheet with almost all light being reflected back to the viewer. Bright white papers illuminate transparent printing inks, giving cleaner, crisper color, and contrasty blacks.

Business Reply Envelope (BRE)- A pre-addressed envelope with a first class permit and return address in which the original sender pays for its return.

Business Return Envelope- An envelope with a pre-printed return address but no postage.

C1S- Paper that is coated on one side only; **C2S** - coated on both sides.

Calcium Carbonate- A chemical compound (CaCO₃), occurring in nature usually from sea deposition, or obtained commercially by chemical precipitation. Chalk is a naturally occurring form used only to a limited extent in papermaking because of the impurities present. The precipitated carbonate is preferred due to its obvious higher purity and smaller particle size than the natural product. Calcium carbonate is used both as a filler and as a coating pigment.

Calender Stack- A set or "stack" of horizontal cast-iron rolls with chilled, hardened surfaces, resting one on the other in a vertical stack at the end of the paper machine. The paper is passed between all or part of these rolls to increase the smoothness and gloss of its surface.

Calendering- The process of finishing a sheet of dried paper by pressing it between highly polished metal cylinders of a calender stack.

Caliper- The thickness of a single sheet of paper measured by a micrometer and expressed in thousandths of an inch.

Cast Coated- High-gloss coated paper manufactured by casting the coating paper against a highly polished, heated steel drum.

Catalog Envelope- An open end, center seam envelope with the seal flap on the short end.

Chain of custody- A systematic procedure for tracking a material or product from its origin to its final use.

Clay- A natural, earthy, fine-grained, substance used as both a filler and a coating ingredient to improve smoothness, brightness, and opacity.

Click- Term for one revolution/one copy on a digital copier/printer.

CMYK- A method of representing color based on the standard printing ink colors of cyan, magenta, yellow, and black.

Coated Paper- Made with a surface coating, which allows for maximum smoothness and ink holdout in the printing process. Coated papers are available in a range of finishes from dull to matte, and gloss.

Commercial Style- Open side envelope with diagonal or double side seam with a commercial style flap.

Converting- The process of manufacturing an envelope from parent-sized sheets of paper.

Cover Paper- Also called card stock, these papers are heavyweight coated or uncoated paper with good folding characteristics. Their diverse uses include folders, booklet covers, brochures and pamphlets.

Cut Size- Papers cut to a small common size, usually 8.5x11" and 17x11". **Dandy Roll-** Used on the wet end of the paper machine to smooth the formation, reduce bubbles, and to impress a watermark, pattern or texture if desired.

Deckle Edge- The rough edges on hand-made and some machine-made papers. It was originally considered an imperfection. The deckle edge came back in fashion with the handcraft revival in the last decade of the 19th century.

Digital Papers- The same characteristics that make a great offset substrate apply to digital substrates: formation, smoothness, and brightness. In addition, digital substrates are made to specific caliper and pre-defined moisture levels and are precision-cut to digital sheet sizes/rolls. These characteristics are built into the manufacturing specs for runnability and performance in digital presses. Digital substrates may also have a product-specific surface treatment for dry toner, liquid toner and inkjet applications. **Dimensional Stability-** The property of a sheet of paper that relates to the consistency of its dimensions, especially as they are affected by changes in moisture content.

Double-Thick Cover- Stiff, durable cover papers produced by laminating together two pieces of equal-weight paper. The resulting sheet is heavy and strong, with excellent printing and folding characteristics

Dry End- The drying section of the paper machine, consisting mainly of the driers, calender reels, and slitters.

ECF- Elemental Chlorine Free: refers to virgin fiber pulps or papers that have been bleached without the use of elemental chlorine gas, thus preventing the formation of dioxins.

Felt- Woven textile, originally wool but now usually synthetic, used to carry the web while moisture is pressed from it. While on the paper machine, the felt acts as a support for the paper web. Felts, if they are rough, can impart a felt finish to the paper.

Finish- (1) Surface characteristics of paper. (2) General term for trimming, folding, binding and all other post press opera

FSC- Forest Stewardship Council is a nonprofit organization that encourages the responsible management of the world's forests and sets standards that ensure forestry is practiced in an environmentally responsible, socially beneficial and economically viable way.

Genuine Felt Finish- A finish applied to paper by means of marking felts while the paper web is still very wet. These felts impart their distinctive textures by gently rearranging the paper fibers. This creates a soft, resilient, textured surface suitable for printing and relief operations.

Grain- The machine direction of paper. The direction in which most fibers lie in a sheet of paper.

Grain Direction- As the paper web is carried forward on the machine, the majority of fibers orient themselves in the machine direction. When the web of paper is sheeted, the sheets will be grain long (fibers that follow the long side of the sheet) or grain short (they follow the short side). Grain direction should be considered during the design process for best results during printing, folding, and converting.

Green Seal- A nonprofit organization devoted to environmental standard setting, product certification, advertising claims substantiation and public education.

Green-e- A program of the nonprofit Center for Resource Solutions which offers certification and verification of renewable energy products (RECs).

Groundwood Pulp- A mechanical wood pulp produced by pressing a barked log against a pulpstone and reducing the wood to a mass of relatively short fibers.

GSM- Grams per square meter is the metric standard for paperweight. GSM calculates the actual weight of a square meter of that particular paper.

Hardwood- Wood obtained from a class of trees known as Angiosperms, such as birch, maple, oak, gum, eucalyptus, and poplar. These trees are characterized by broad leaves and are usually deciduous in the temperate zones.

Hardwood Pulp- Any pulp made from a hardwood or mixture of hardwoods by either a chemical or mechanical process.

Headbox- On fourdrinier machines: A large flow control chamber which received the dilute paper stock or furnish from the stock preparation system and by means of baffles and other flow evening devices, maintains sufficient agitation of the mixture to prevent flocculation of the fibers, spreads the flow evenly to the full width of the paper machine and provides delivery of stock to the fourdrinier wire uniformly across its full width.

Ink Holdout- A characteristic of paper related to its capacity to keep ink sitting on its surface rather than absorbing into the sheet. Better ink holdout produces sharper printed images.

Integrated Mill- A paper or board mill that produces substantially all its own pulp. A partially integrated mill is one that produces some but not all of its pulp. A non-integrated mill is one that has the luxury to purchase quality pulps in the open market.

Laid- A linear pattern which is applied by a dandy roll while the paper is still very wet, to mimic the effect of some hand-made papers. The laid dandy roll is comprised of wires that run parallel to the roll's axis (laid lines), and chain lines, which connect the laid lines and run in the grain direction.

Laser Paper- Very smooth, low-moisture papers manufactured in cut sizes for laser printers and office duplicating equipment. Low moisture prevents paper curling from high heat in laser printers.

Linen Finish- One of the many textured effects that is produced by embossing a web of paper with a patterned steel roll. Embossing takes place off the machine as a separate operation.

Liner- The backing material that supports the pressure sensitive face sheet.

M Weight- The weight in pounds of 1000 sheets of paper.

Machine Direction- The direction of paper parallel with the direction of movement on the paper machine. It is also called the grain direction.

Moisture Content- The amount of moisture found in a sheet of paper. If the moisture content in a sheet is too high or too low, the paper can curl or build up static, which affects the way it runs through a press, printer or copier.

Opacity- Measure of the percentage of light passage through a sheet of paper. The more opaque a paper is, the less show-through there will be from printing on the sheet below. Basis weight, brightness, type of fibers, fillers, coatings, and formation all influence opacity. Generally, opacity and brightness are inversely related to each other: the brighter the paper, the less opaque. Other factors that affect opacity are bulk, surface smoothness, and shade.

Paper Grade- A system used to classify papers by their common features or content, such as recycled, coated or newsprint papers.

Paper Merchant- A liaison between the paper manufacturer and the paper buyer who offers a number of lines of papers and can offer advice to buyers on the best sheets to specify for particular jobs. Merchants sell paper and envelopes to printers.

PCF- Process Chlorine Free refers to postconsumer recycled fiber pulps and papers that were processed without the use of any additional chlorine or chlorine compounds. If these papers also contain a percentage of virgin fiber, the virgin fiber must have been processed without the use of any chlorine or chlorine compounds (TCF). Because PCF paper contains recycled-content fibers, PCF paper production can also reduce water, energy and virgin fiber usage.

Point- One thousandth of an inch. It is used in expressing the thickness of paper or board.

Postconsumer Waste- A material or product that has served its intended use and has been discarded for disposal after passing through the hands of a final user. PCW is a part of the broader category "recycled material".

Pressure Sensitive- Any product that has a liner with a face sheet that has an adhesive applied.

Pulper- A machine designed to break up, de-fiber, and disperse dry pulps.

Rainforest Alliance- The Rainforest Alliance is a leading international conservation organization whose objective is to protect the environment, wildlife, workers and communities by implementing better business practices for biodiversity conservation and sustainability.

RECs- Renewable Energy Certificates are tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource.

Recycled- A product which has met the end of its useful life and is then remanufactured into another product.

Removable Adhesive- Adhesive is aggressive but removable.

Renewable energy- Renewable energy is energy that is derived from continuously available sources that do not rely on exhaustible fossil fuels like coal, oil and gas. Examples of renewable energy are wind, solar, hydroelectric, and geothermal.

Saddle Stitching- To bind by stapling sheets together where they fold at the spine.

Sheffield- A test used to measure the smoothness of paper by measuring the rate of airflow over the surface of the sheet. The lower the number, the smoother the sheet.

Size- Any material used in the internal sizing or surface sizing of paper and paperboard. Sizing

SmartWood- A nonprofit environmental organization whose purpose is to improve the effectiveness of sustainable forestry in conserving biodiversity and providing equity for local communities, fair treatment to workers and creating incentives for businesses so that they can benefit economically from responsible forestry practices.

Smoothness- The surface quality of a sheet of paper, related to the flatness of the sheet. Smoothness affects ink and toner receptivity. The Sheffield scale measures smoothness. A higher value typically indicates a rougher sheet.

Softwood- Wood from coniferous trees whose leaves are needle-like such as pine, spruce, or hemlock or scale-like as cedar.

Softwood Pulp- A pulp made from softwood or coniferous wood species.

Starch- A white, odorless carbohydrate found in various plants. When extracted and purified, primarily from tapioca, corn, potatoes, and wheat, it is used in paper as an adhesive or sizing agent.

Sustainable- Development practices that are inclusive of business, social, and environmental goals.

Synthetic- Refers to any non-paper product such as polyester, flexible vinyl, PVC, etc.

TAPPI- An acronym for the Technical Association of the Pulp and Paper Industry which is concerned with the establishment of testing standards, etc. for the pulp and paper industry.

TCF- Totally Chlorine Free; refers to virgin fiber pulps and papers which have been bleached without the use of any chlorine at all. Alternative bleaching techniques using oxygen, ozone, or hydrogen peroxide are employed instead. TCF pulps are not readily available in the US.

Text and Cover Papers- A class of high-quality uncoated papers in a wide variety of colors and textures. Text is usually made with a matching or coordinating cover.

Tooth- Refers to a paper's surface roughness.

Ultra Cling- Repositionable, lightest tack, leaves no residue.

Ultra Removable Adhesive- Repositionable, leaves no residue.

Uncoated Paper- Paper manufactured with no surface coating. There is a wide variety of grades and levels of quality among uncoated papers.

Vellum Finish- An uncoated paper finish that is fairly even but not quite as even as a smooth finish.

Watermarks- Designs formed in fine wire or in low-relief metal castings and sewn onto the dandy roll. The resulting thick and thin areas make the watermark slightly more translucent than the rest of the sheet. Watermarks were historically used to convey a sense of quality in letterhead papers.

Wet End- That portion of the paper machine between the headbox and the dryer section.

Wire Side- The side of the sheet that rests on the paper machine wire as it moves through the wet end, as distinguished from the felt or top side.

Writing Paper- Suitable for pen and ink, pencil, laser printing or offset printing. Writing grades are designed for letterheads, corporate identity programs, and office copiers.

Xerography- An electrophotographic process that electrostatically charges an image on a photoconductive drum or belt. The charge attracts toner, which is then fused to paper.