Artistic paper, supplies and paper education.

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absorbency

the capacity a paper has for accepting liquids, such as the inks or water used to run offset lithographic presses.
see also ink absorption, ink holdout

acid-free paper

paper manufactured on a paper machine with the wet-end chemistry controlled to a neutral or slightly alkaline pH.
see also alkaline papermaking, archival, permanence, pH, wet end

actual weight

the true weight of any volume of paper. The actual weight of paper is used to determine both purchase price and shipping costs.
see also basic size, basis weight, weight

additives

ingredients of paper other than pulp. Additives include clay fillers, dyes, sizing, and other chemicals.
see also clay, ingredients of paper, papermaking, sizing

alkaline papermaking

the manufacture of paper under alkaline conditions using additives, caustic fillers like calcium carbonate, and neutral size. Alkaline paper is usually used where aging resistance is desired. It's the logical choice for documents, books, and maps.
see also acid-free paper, archival paper, calcium carbonate, lignin, papermaking, permanence, pH, sizing

alum

also called hydrated aluminum sulfate or papermaker's alum. A papermaking chemical that's typically used when adding rosin size to pulp, alum imparts water-resistant properties to paper. In practical terms, it keeps paper from sticking to the presses.
see also rosin, sizing

aqueous coating

a water-based coating applied after printing, either while the paper is still on press ("in line"), or after it's off press. An aqueous coating usually gives a gloss, dull, or matte finish and helps prevent the underlying ink from rubbing off. Unlike a UV coating or a varnish, an aqueous coating will accept ink-jet printing, making it a natural choice for jobs that require printing addresses for mass mailings.
see also coated paper, finishing, UV coating, varnish

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. The expected life of archival paper is more than 100 years.
see also acid-free, alkaline papermaking, permanence, pH

backing up

printing the reverse or back side of a sheet that has already been printed on the obverse or front side.
see also imposition

basic size

the customary sheet size used to establish the basis weight of a ream (500 sheets) of a given grade of paper. Standard basic sizes vary by paper grade. For example, the basic size of book paper is 25" x 38", while the basic size of cover stock is 20" x 26".
see also basis weight, weight

basis weight

the weight, in pounds, of a ream (500 sheets) of a paper cut to a standard (basic) size. Each major paper grade, like cover, bond, or offset, has its own basic sheet size, which determines its basis weight. For example, the basic size of book paper is 25" x 38" for 500 sheets; therefore, 500 sheets of 70 lb. offset book paper in 25" x 38" will actually weigh 70 pounds.

Although the sheets in a given ream of paper may be larger or smaller than this example, basis weight refers to how much that ream would weigh if all the sheets were the related basic size.
see also basic size, ream weight, weight

binding

fastening papers together for easy reading, transport, and protection. Papers may be bound together with a variety of materials, like wire, thread, glue, and plastic combs.

types of binding:

case binding or edition binding

folded sheets are collected into signatures, which are then stitched to each other with thread. Adhesive is applied to the spine of the sewn signatures, and a wide strip of gauze is applied to the adhesive; the edges of the gauze strip extend an inch or so beyond the spine. Rather than being glued to the spine, the case (or hard cover) is glued to the gauze extensions and to the first and last pages of the book, called end leaves or end papers.

lie-flat soft cover binding

a variation of perfect binding, similar to case binding. The spine of the pages is not affixed to the spine of the cover, so the glued sheets open flat, up and away from the less flexible cover.

mechanical binding

single sheets are stacked together; holes are punched along the binding edge; and a plastic comb or spiral wire is inserted into the holes.

notched binding
see perfect binding

perfect binding

single sheets are stacked together, the binding edge is ground to create a rough surface, adhesive is applied to the binding edge, and a cover is wrapped around the pages.

Signatures or folded sheets may also be stacked together. The folds on the binding edge are similarly ground away to create a stack of single sheets with a rough surface, which is then bound with adhesive and a cover.

Several variations have improved the durability of perfect- bound books. For example, the strength of the binding may be increased by using a gauze or fabric strip added to the binding edge. Or, the binding edge may be notched, with the adhesive in the notches holding the pages together. This is called notched binding.

saddle-stitched binding

folded sheets or signatures of paper are gathered together one inside the other, placed over a "saddle," and stitched or stapled along the spine with wire. Saddle-stitched books will lie flat when open but may contain only a limited number of pages, as determined by the thickness of the paper used and its foldability.

side-stitched binding

single sheets or folded sheets of paper are stacked together and stapled at the edge. Side-stitched books won't lie flat when open, but this binding still will hold many more pages than saddle-stitched books.
see also finishing, folding, imposition, scoring, signature

blade-coating

a method of coating paper and paperboard using a flexible blade to control the amount of coating applied to the paper. The coating is made of pigments, additives, and adhesives. Blade-coating can take place either on the papermaking machine or on an off-machine coater.

While paper may be coated on one side (C1S) or both sides (C2S), blade-coated papers are usually calendered. This helps create a compressed sheet with a glossy surface, reduced bulk, and enhanced printing properties.
see also bulk, calendering, clay, coated paper

blanket

see impression cylinder, offset

Bleach Filtrate Recycling (BFR*) process

A groundbreaking new patented process that recycles process wastes from the bleach plant instead of discharging them to the waste water treatment facility. This technology uses Champion's OD100* bleaching process, and is being demonstrated at Champion's Canton, North Carolina mill.
see also elemental chlorine free (ECF), OD100 process*

bleaching

a chemical treatment used to whiten and purify pulp. Bleached pulp is known for being strong and durable.
see also elemental chlorine free (ECF), OD100 process, papermaking, pulp*

bleed

an image or printed color that runs off the trimmed edge of a page. Bleeding one or more edges of a printed page generally increases both the amount of paper needed and the overall production cost of a printed job.
Bleeds are created by trimming the page after printing.

blind embossing

stamping raised letters or images into paper using pressure and a die - but without using foil or ink to add color to the raised areas. Braille is an example of blind embossing.
see also debossing, embossing

bond paper

a type of office reprographic paper, widely used for letterheads and business forms. Bond papers are characterized by strength, durability, and performance during electronic printing. They are manufactured with a basic size of 17" x 22".
see also basic size, electronic printing, office reprographic paper, xerography

bonding strength

the internal strength of a paper; the ability of the fibers within a paper to hold to one another. Bonding strength measures the ability of the paper to hold together on the printing press. Good bondingstrength prevents fibers from coming loose ("picking").
see also picking, pick out, sizing

book paper

a type of offset paper with a basic size of 25" x 38". The primary applications for these products are book publishing, commercial printing, direct mail,

technical documents, and manuals.
see also basic size, offset papers, text papers

brightness

the reflectivity of pulp, paper, or paperboard under test conditions, using a specially calibrated measuring instrument. If paper lacks brightness it will absorb too much light and little will reflect back through the ink.
see also fluorescent dye, refractiveness, whiteness

bristol paper

solid or laminated heavyweight paper made to a caliper thickness of .006" or higher. Bristols are generally used for tags, covers, and file folders. They have a basic size of 241*2" x 301*2".
see also basic size, cover paper, tag paper

bulk

the thickness of a stack of paper, technically measured as the thickness of a specified number of sheets under a specified pressure. For example, using the measurement of an inch, fewer than 100 bulky bristol sheets may make an inch-deep pile. On the other hand, it may take hundreds of sheets of a lower-bulk text paper to make an inch. Where thickness or the illusion of substance is desired, bulk is a key factor.
see also caliper, thickness

C1S

paper with a coating on one side only (coated one side).

C2S

paper with a coating on both sides (coated two sides).

Calcium Carbonate

CaCO3, a naturally occurring substance found in a variety of sources, including chalk, limestone, marble, oyster shells, and scale from boiled hard water. Used as a filler in the alkaline paper manufacturing process, calcium carbonate improves several important paper characteristics, like smoothness, brightness, opacity, and affinity for ink; it also reduces paper acidity. It is a key ingredient in today's paper coatings.
see also alkaline papermaking, ingredients of paper

calendering

the process of finishing a sheet of dried paper by pressing it between the highly polished metal cylinders of a calender "stack." The calender smoothes the paper by compression.
see also finish, papermaking, smoothness, supercalendering

caliper

the thickness of a single sheet of paper, as measured with a sensitive tool called a micrometer, and expressed in units of thousandths of an inch. Caliper is a critical measure of uniformity. Excessive variation in caliper can lead to print variation, undesirable visual effects, and uneven stretch or press-feeding problems. It can also create problems in folding and binding.
see also bulk, thickness

case binding

see binding

cast-coating

paper produced with a surface that is a reasonably accurate replication of some other surface. To manufacture cast-coated paper, a paper web with wet or moistened coating is brought into contact with a polished chrome drum surface. This surface is replicated on the coated sheet.

In general, cast-coated papers combine a superior flat surface with excellent ink receptivity, making them the best of printing surfaces for all printing processes.
see also coated paper, dot gain, finish, smoothness, wet trap

cellulose fiber

the main component of the walls of all plant cells, cellulose gives plants their structural support and makes plant material fibrous. Both cotton and wood fibers contain mostly cellulose.
see also fiber, ingredients of paper, paper, pulping wood

chemical pulping

manufacturing pulp from wood or other raw fibrous material by pressure cooking it with various chemical liquors. The predominant chemical pulping process is the sulfate (kraft) process.
see also kraft, papermaking, pulping wood

clay

a naturally occurring substance commonly used in the paper industry. Clay is used as both a filler and a coating ingredient. By adding clay, papermakers can improve a paper's smoothness, brightness, opacity, and affinity for ink. Also known as "kaolin clay."
see also additives, coated paper, filler, ingredients of paper, opacity

coated paper

paper with an outer coating applied to one or both sides. The coating may be added while the paper is still moving through the papermaking machine, or after it comes off the machine.

Coated papers are available in a variety of finishes, including gloss, dull, and matte. They tend to have good ink holdout and minimal dot gain, which can be especially important for recreating sharp, bright printed images, black-and-white halftones, and four-color process images. The smooth surface of coated papers also helps to reflect light evenly.see also cast-coating, clay, dot gain, dull coated, four-color process, gloss, halftone, ink holdout, matte coated, off-machine coating

Colorcurve System

a color matching system based on light reflectance curves rather than on ink formulations. It is intended to coordinate colors across a variety of surfaces and materials and to reduce metamerism.
see also match color, metamerism, PANTONE MATCHING SYSTEM, Toyo**

colorfastness

having color that won't run when wet and won't fade in bright light.

color separation

separating full-color artwork or transparencies into the four primary printing ink colors of magenta (red), cyan (blue), yellow, and black by using various photographic or scanning processes, the most common being electronic laser

scanners. Technological advances in this area take place continuously.
see also four-color process, subtractive colors

comp (comprehensive)

a complete but prospective example of a design project, demonstrating size, layout of images and type, use of color, and paper.
see also dummy

continuous tone

having an unbroken range of intensities, as seen in black-and- white photographs. Continuous tone images have not been screened and contain gradient tones from black to white.
see also halftone, screen, stochastic

contrast

the degree of difference between light and dark areas in an image. Extreme lights and darks give an image high contrast. An image with a narrow tonal range has lower contrast.

cotton paper

paper with a minimum cotton fiber content of 25% and a maximum fiber content of 100%. When fiber other than cotton is used, the balance comes from wood pulp. Cotton pulp is made from rags or clippings from textile mills, raw cotton, and cotton linters. Cotton papers are used primarily as writing papers.

cover paper

heavier, generally stiffer paper commonly used for book covers, folders, greeting cards, business cards, and brochures. Uncoat-ed cover papers generally match the color and finish of corresponding text papers. The basic size of cover stock is 20" x 26".
see also basic size, text paper

curl

the waviness of a sheet of paper, most apparent along its edges. Physical stresses or changes in humidity cause most curling. This may occur at the paper mill, in the pressroom, on press, or after binding. Paper tends to curl along, rather than across, the grain of the paper. Recycled and recycled content papers have less tendency to curl than virgin fiber papers because their fibers are shorter.
see also grain, relative humidity

cut-size

writing or business papers that are cut to a finished size of 81 2" x 11", 81 2" x 14", or 11" x 17".

cylinder machine

a type of papermaking machine. Wire-covered cylinders are rotated through a vat of pulp, and paper is formed as the water drains from the cylinder. Cylinder machines are used primarily to manufacture paperboard. Multicylinder machines produce multi-layered paperboard (one layer for each cylinder).
see also paperboard, papermaking

dandy roll

a wire mesh cylinder used to smooth the top of paper as it forms. Enhancing both surface smoothness and formation, the dandy roll may also carry a design, which will create a watermark that identifies the sheet.
see also laid finish, papermaking, watermark

debossing

pressing letters or illustrations into a sheet of paper using a metal or plastic die to create a depressed (debossed) image.
see also embossing

deckle edge

the feathery edge on a sheet of paper, created as the paper machine sprays a stream of water or a jet of air across the paper as it's formed. Deckle edges can also be created after the paper is made, using a die. This method creates a less feathery, harder-edged deckle.

deinking

removing ink and other finishing materials, such as coatings, sizings, and adhesives, from printed paper. The complex deinking process makes recycling paper difficult and ultimately adds to the cost of a recycled sheet of paper. To produce high-quality recycled or recycled content papers for printing and writing, the deinking process needs to be thorough. The goal is a reusable fiber that has few impurities, since impurities lower the quality of a recycled sheet and can damage equipment in the papermaking and printing process. Modern offset and flexographic inks, photocopier and laser printing "inks," ultraviolet and thermography coatings, and adhesives make it increasingly difficult to deink paper.

Deinking paper begins with pulping, a process that closely resembles virgin fiber pulping. Fibers swell in the water, and as they rub against each other the impurities start to fall away. Heat and chemicals speed the process. Screening then removes large, heavy contaminants, and fine screening removes the smaller, lighter ones.

Next the pulp is washed, similar to the way clothes are washed. Upon contact with detergents, the ink changes from its usual water-repelling state to a water-attracting state, which allows it to be rinsed away. This removes a great deal of the ink, but not all of it; depending on the paper being manufactured, the flotation process may follow.

Flotation is another deinking method. It's the opposite of washing, in that the ink is turned back to its water-repelling state. Foaming agents create air bubbles that attract the ink particles. The air bubbles and ink rise to the surface, and are floated off.

Any inks left after washing and flotation may be dispersed or bleached. Dispersion breaks the ink particles into tiny bits that stay in the pulp but that are invisible to the eye. These small ink particles dull the paper, and bleaching may be needed to remove the last of the inks and improve brightness.

Paper with laser-printed or photocopied "ink" presents special deinking problems. Laser printer and photocopy inks are plastic polymers that melt together and bond to the paper in the "printing" process. The deinking methods described above do not remove these inks, and researchers continue to look for better ways to make these inks stick together into large, removable particles. In the meantime, many deinking facilities reject office paper waste that has a high "laser" content.
see also bleaching, flotation, pulping wood, recycled paper

densitometer

an instrument used throughout a print run to measure the optical density of ink on paper.

density

the weight of a sheet of paper as compared to its bulk. For example, a paper that weighs more than another paper but is thinner has a higher density. Compacting the fibers creates a dense paper.
see also bulk, weight

die-cutting

using a formed, metal-edged die to precision cut or to cut shapes into a piece of paper. If a printing project requires a custom-made die, the total cost of the job will increase.

dimensional stability

a measure of paper's tendency to stretch or shrink, especially when affected by changes in moisture content from humidity, the printing process, or even the passage of time. Paper that maintains its original dimensions has a high degree of dimensional stability.

Paper with low dimensional stability may change size slightly during the printing process and cause mis-registration. When used in laser printers, paper with a low dimensional stability may jam the printer or wrinkle. Allowing paper to acclimate to the pressroom before printing will help it maintain dimensional stability.
see also grain, relative humidity, resilience, runnability

dispersion

see deinking

dot compensation

adjusting the size of the dots in halftones or four-color images to allow for dot gain and to ensure that the image color and detail print as intended.
see also dot gain, four-color process, halftone, ink holdout, screen

dot gain

the tendency for the dots in halftones and four-color images to print larger than they are on the film or plate. If the printer does not compensate for this, images may be distorted, appearing darker or less vivid than intended.
see also dot compensation, four-color process, halftone

dpi (dots per inch)

the number of dots that fit horizontally and vertically into a one-inch measure. Generally, the more dots per inch, the more detail is captured, and the sharper the resulting image.
see also halftone, lines per inch, screen

dry end

the drying section of the papermaking machine, after the press section, at which point most water has been removed from the paper. As paper moves through the dry end, the drying process is completed and the paper reel is wound.
see also drying, felt, papermaking, wet end

dry trap

a layer of wet ink being applied over a previous layer of dry ink in a separate run of the printing press. Dry trapping usually produces sharper images than wet trapping because subsequent layers of ink aren't diluted by prior wet or damp layers. Dry trapping is also more expensive because the paper travels through the press more than once.
see also trapping, wet trap

drying

the step in the papermaking process that brings the moisture content of paper to approximately 5%. This is done by moving the web of paper around a series of heated iron drums in the dry end of the paper machine.
see also dry end, papermaking

dryographym

waterless offset lithography. This printing process allows the use of extremely fine line screens to produce high resolution printing.
see also offset, waterless printing

dull coated

a coated paper finish that falls between glossy and matte.
see also coated paper, gloss, matte coated

dummy

an unprinted mock-up of a book, brochure, or "to-be-printed" piece. A dummy is made of the same paper stocks that will be used in the finished piece and serves as a reference for the client, designer, printer, mailing house, or distributor. The printer, paper merchant, or paper consultant generally provides the dummy at the request of the designer.
see also comp, paper consultant

duotone

a two-color halftone of an image created with two screens, two plates, and two colors. Most halftones are one color, printed with black ink on white paper. By blending the black of the tiny ink dots and the white of the paper, the human eye sees shades of gray.

Duotones are made by printing an image with two colors, generally black and a second color. The full range of tones are printed black and the middle range of tones are printed in the second color. The result is a striking image with more richness and depth than a one-color halftone.

The image can be further enhanced by printing a tritone or a quadratone; these are also reproductions of black-and-white images, perhaps with a touch of color. The cost of printing tritones or quadratones may be as high as or higher than four-color process printing.
see also four-color process, halftone, quadratone, screen, tritone

dust

tiny, free pieces of fiber, filler, or coating on paper. During printing, dust may adhere to the blanket and prevent ink from reaching the paper surface. This creates imperfections on the finished sheet.
see also hickey, jog

electronic printing
a printing method that creates images with electrostatic charges, rather than by pressing ink onto a plate. Photocopiers and inkjet or laser printers use electronic printing.
see also electrophotography, printing methods, xerography

electrophotography

a printing process that uses principles of electricity and electrically charged particles to create images. In photocopiers and laser printers, electric charges create the image on an electrophotographic surface that works as a printing plate. This surface is cleared after each image or copy is made, and is used over again for the next copy.
see also electronic printing, printing process, xerography

elemental chlorine free (ECF)

the more common name for "molecular chlorine free," and a bleaching process that doesn't use chlorine gas.
see also bleaching, OD100 process, papermaking*

embossing

pressing a shape into a sheet of paper with a metal or plastic die, creating a raised (embossed) image.
see also blind embossing, debossing

enamel

a general term referring to coated paper that has a higher basis weight than coated publication (magazine) paper but a lower basis weight and caliper than coated cover paper.
see also C2S, coated paper

engraving

a printing process using intaglio, or recessed, plates. Made from steel or copper, engraved plates cost more than plates used in most other printing processes, such as lithography. Ink sits in the recessed wells of the plate while the printing press exerts force on the paper, pushing it into the wells and onto the ink. The pressure creates raised letters and images on the front of the page and indentations on the back. The raised lettering effect of engraving can be simulated using a less costly process called thermography.
see also intaglio, plate, printing process, thermography

envelope

paper that is folded and glued in a wide variety of sizes and shapes for carrying letters or other materials. Many printing jobs will end up in an envelope. The closer a finished piece is to an envelope size, the easier it will be to mail and the

less chance it will be damaged by jostling around inside the envelope. An envelope maker can make just about any size envelope needed, but a custom envelope requires a custom die and carries a custom price.

felt

a fabric of natural or synthetic fibers used in the press section of a papermaking machine to absorb water from the paper as it is manufactured.
see also felt finish, papermaking

felt finish

a soft texture that affects the look but not the strength of an uncoated paper. A felt finish can be created at the wet end during the papermaking process in one of two ways: either with a roll that is covered with a felt or with a rubber roll with a felt-patterned finish. An embossed felt finish is created off the machine, after the paper has dried.
see also felt finish, finish, papermaking, wet end

felt side

the top side of the paper, which comes in contact with the dandy roll and felts during the papermaking process. The bottom side of the paper, which comes in contact with the wire (forming fabric) of the papermaking machine, is called the wire side.

The felt side of a paper may appear to be softer, while the wire side of a paper may have more "tooth." During printing, the softer texture of the felt side of an uncoated paper may pick up slightly more ink than the wire side of the same sheet, and the printer may have to adjust ink densities to compensate for this. Paper is generally packed and shipped as it is made: felt side up.
see also finish, papermaking, tooth, two-sidedness, wire side

fiber

filaments of plant tissue, such as cotton fiber and wood fiber. Some specialty papers may contain synthetic fibers, such as rayon or nylon.
see also ingredients of paper

fiber-added paper

paper with visible fibers, flecks, and specks. The term may be a bit misleading because all paper is made from fiber. The most common fiber additives are wood chips, colored cotton fibers, and colored rayon fibers.
see also recycled paper, recycled-content paper

filler

materials - like clay - added to pulp before it's formed into paper. Fillers improve a sheet's smoothness, brightness, and affinity for ink.
see also clay, ingredients of paper

finish

the surface characteristics of a paper. Finishes may be created on-machine or

off-machine. On-machine finishing can be done two ways. For a smooth or vellum finish, pressure is imparted on the sheet with a finishing "stack." Laid or felt finishes are made with a marking roll, which actually presses the pattern into the paper while it's still wet.

Off-machine finishes are called embossed finishes. This separate step presses the paper between a steel pattern roll and either a hard cotton backing roll (to create the finish on both sides) or a plastic roll (for smoothness on one side).

Several generic terms describe the various finishes of uncoated paper, such as vellum, smooth, and laid. Individual paper manufacturers may not use these terms consistently, instead using unique names for common finishes.
see also calendering, embossed, papermaking, supercalender

finishing

preparing printed pages for use. Most printed jobs require one or more finishing steps, such as trimming, folding, or binding.
see also binding, folding, trimming

flexography

a direct (not offset) printing method that uses relief plates, similar to rubber stamps, which are made from rubber or photopolymer. The flexible plates are wrapped around a cylinder on the printing press. "Flexo" works best when printing large areas of solid color, making it popular for printing plastic bags, wrapping paper, and milk cartons. It's also used for the Sunday color comics and newspaper inserts. Rubber manufacturers, eager to find new uses for rubber, have invested heavily in flexographic research, and improvements have been made in ink coverage and four-color registration.
see also four-color process, offset, plate, printing process, registration, relief

flotation

a method for removing ink from paper during the deinking process by floating it off the paper.
see also deinking

fluorescent dye

a coloring agent added to paper to increase its brightness. Fluorescent dyes give white papers added brilliance in natural light and may add a slight cast - like blue or green.
see also brightness, refractiveness, whiteness

fluorescent inks

printing inks that both emit and reflect light. Generally, these inks are brighter and more opaque than traditional inks. Using one or more fluorescent inks can actually brighten a printed image - especially four-color process images printed

on uncoated stock. On the down side, fluorescent inks are not colorfast and will fade in bright light and sunlight over time. They can also have a negative effect on dot gain and trapping, making the printing less sharp and less detailed.
see also dot gain, trapping

foil stamping

to cover paper with a thin, flexible sheet of metal or other material. The foil, which may be clear or opaque, comes in a range of colors and is carried on a plastic sheet. Stamping separates the foil from the plastic and makes it adhere to the paper. Foil stamping can be combined with embossing or debossing as an added design element.
see also debossing, embossing

folding

doubling up a sheet of paper so that one part lies on top of another. Folding stresses the paper fibers. To create a smooth, straight fold, heavy papers like cover stocks and bristols need to be scored before they're folded.

Multiple fold strength is important for paper used in books, maps, and pamphlets. It's far less important in one-fold greeting cards or envelopes, where fold cracking is the vital consideration. The drying heat of printing and finishing operations can negatively affect folding strength.
see also binding, finishing, gatefold, imposition, scoring, signature

form

the assembled pages and images as printed on a single large sheet, before trimming. With the correct imposition, the pages of a form will be in correct order after folding and trimming. Once folded and trimmed, a form becomes a "signature."
see also folding, imposition, signature, trimming

formation

the uniformity of fibers in a sheet of paper. For example, paper with fine formation has evenly dispersed fibers and will be smoother and more uniform than a paper with uneven formation. The tighter the fibers are bound, the more uniform the surface, and the better the printed sheet usually looks.
see also fiber, grain

four-color process

a method that uses dots of magenta (red), cyan (blue), yellow, and black to simulate the continuous tones and variety of colors in a color image. Reproducing a four-color image begins with separating the image into four different halftones by using color filters of the opposite (or negative) color. For instance, a red filter is used to capture the cyan halftone, a blue filter is used to capture the yellow halftone, and a green filter is used to capture the magenta

halftone. Because a printing press can't change the tone intensity of ink, four-color process relies on a trick of the eye to mimic light and dark areas.

Each halftone separation is printed with its process color (cyan, magenta, yellow, and black). When we look at the final result, our eyes blend the dots to recreate the continuous tones and variety of colors we see in a color photograph, painting, or drawing.
see also color separation, continuous tone, dpi (dots per inch), halftone, screen, subtractive color, touchplate

Fourdrinier

a papermaking machine with a horizontal continuous wire belt. A slurry of pulp is poured or sprayed onto the wire (forming fabric), the water is then drained off and pressed out, and the paper is dried.
see also papermaking

freesheet

paper that contains no more than 10% mechanical wood pulp. Most freesheet papers are "free" of mechanical (groundwood) pulp.
see also pulping wood, uncoated freesheet, uncoated paper

furnish

fully prepared pulp and all its ingredients: fiber, fillers, sizing, and pigments - diluted with water and ready for the papermaking machine. Furnish contains about 99% water.
see also ingredients of paper, pulp, slurry

gatefold

two or more parallel folds on a sheet of paper with the end flaps folding inward.
see also folding

gloss

the property that's responsible for a coated paper's shiny or lustrous appearance; also the measure of a sheet's surface reflectivity. Gloss is often associated with quality: higher quality coated papers exhibit higher gloss.
see also cast-coating, coated paper

grade

a type or class of paper identified as having the same composition and characteristics. This generic paper category includes writing, offset, cover, tag, and index paper. It can also refer to the quality level of the paper or to a mill's specific brand of paper.

grain

the direction in which most fibers lie in a sheet of paper. As paper is formed, the slurry of fibers moves forward on the forming wire at high speeds, aligning the fibers in the direction of the movement and creating the grain. At the same time, the machine shakes the slurry of fibers from side to side, so that the fibers crisscross. This crisscrossing creates a web of fibers, and gives the paper strength in both directions while maintaining a predominant grain, or direction.

As the moisture in the air changes, the individual fibers take in moisture and swell sideways, rather than from end to end; this explains why paper will expand or shrink across the grain and is more flexible along the grain but stiffer against the grain.

For books and other bound work, the grain should run parallel with the binding, creating a smoother fold, making the pages easier to turn, and allowing the paper to swell across the grain. If the binding runs across the grain, the free ends of the paper will swell or shrink with moisture changes, but the bound ends will not. The book will buckle and the binding will weaken.

With sheet paper, the grain direction is indicated by underscoring the dimension along which the grain lies or by changing the order of the numbers. For example, a 23" x 35" sheet is grain long; a grain short sheet is indicated by 23" x 35" or 35" x 23". On web paper, the grain runs along the length of the paper web.
see also binding, formation, grain long, grain short, papermaking, slurry

grain long

grain running along the length, or long side, of a sheet of paper (23" x 35"). Fibers line up parallel to the long side of the paper. This book in your hands is

an example of grain-long binding.
see also grain, grain short

grain short

grain running along the width, or short side, of a sheet of paper (35" x 23"). Fibers line up parallel to the short side of the paper.
see also grain, grain long

grammage

weight in grams of a quantity of paper cut to sheets that measure one square meter.
see also weight

gravure

a printing process that uses intaglio, or recessed, image carriers. The image carrier, which is flat or cylindrical, moves through an ink pool. A blade scrapes excess ink off the plane of the plate, leaving ink in the recessed wells. A second cylinder presses the paper onto the plates, where it picks up ink from the wells. The high speed of gravure presses and the durability of the metal intaglio plates make gravure an economical printing method suitable for large print runs (more than two million copies).
see also intaglio, plate, printing methods

gripper

the row of clips holding the sheet of paper as it moves through the press.
see also gripper edge

gripper edge

the leading edge of paper that moves through a printing press or folding machine. No printing can take place on the outside 3/8" of the paper on the gripper edge.
see also gripper

groove finish

a textured paper with shallow, parallel furrows or grooves running along the surface. This finish is created by embossing the paper after it comes off the papermaking machine.
see also embossing, finishes

groundwood paper

paper that contains between 10 and 75% groundwood pulp. The groundwood pulping process, also known as mechanical pulping, leaves many natural impurities, like lignin, in the paper.

As a result, groundwood paper is less bright and ages faster than freesheet paper, which is made from chemical pulping. Groundwood paper isn't recommended for any printed matter that is expected to last over time. The advantages of groundwood are that it's lightweight, bulky, and economical.
see also bulk, freesheet, lignin, pulping wood, uncoated groundwood

guillotine

a machine used to trim stacks of paper, which works the same way the original French guillotine worked. A cutting blade moves between two upright guides and slices the paper uniformly as it moves downward.
see also trimming, trim size

halftone

a printed picture that uses dots to simulate the tones between light and dark. A printing press cannot change the tone of ink - it will only print the ink color being used on press. This works well for printing text or line art: the press simply puts a full dose of ink for each letter or line onto the paper, creating small solid areas of ink.

But black-and-white photographs are continuous tone images, and printing a photograph this way would have the same result: large solid areas of ink. White areas of the photograph would have no ink; black areas would have black ink; and gray areas would have black, not gray, ink.

The halftone mimics the continuous tone of a black-and-white photograph by converting the picture to dots. Photographing a continuous tone image through a screen creates a duplicate image made of dots. Darker areas of the photograph have bigger dots and lighter areas of the photograph have smaller dots. To the human eye, the black of the dots blends with the white of the paper to create shades of gray. The result is strikingly similar to the continuous tone of a photograph.
see also continuous tone, duotone, four-color process, quadratone, screen, tritone

hardwood pulp

pulp made from deciduous trees (trees that drop their leaves, such as maple and oak). Hardwood pulp has short fibers, which give paper bulk, body, and smoothness. Papers are often made from a blend of hardwood and softwood pulps, combining the qualities of both into a single paper.
see also softwood pulp

headbox

the compartment that holds pulp slurry before it's sprayed or poured onto the paper-forming wire of a papermaking machine.
see also papermaking, slurry, wet end

hickey

an irregularity in the ink coverage of a printed page. Hickeys are caused by paper or pressroom dust, dirt, or pick out on the printing blanket, all of which prevent the ink from adhering to the paper surface.
see also dust, picking, pick out

hydropulper

equipment used to slurry pulp. Water is added to dry pulp and fillers and agitated until the mixture becomes the consistency of cooked oatmeal cereal.
see also papermaking, slurry

imposition

also called image assembly; refers to assembling printed matter so that pages appear in correct sequence.

Creating an imposition involves planning the printing job to ensure that folded and cut pages appear in the correct order: page two on the back of page one, and so forth. Imposition planning also minimizes paper waste by allowing the printer to print as many pages as possible on a full-size, uncut sheet of paper. For a job with one or just a few pages, two or more copies of the same page can be printed on a single uncut sheet. This economical imposition design is referred to as "two up," "three up," and so forth.

For a two- or three-color job, imposition planning can help minimize runs through the press and reduce make-ready time. For larger press runs, most paper mills will manufacture a special size of paper called a "manufacturing order," which allows the printer to use the most efficient and economical imposition.

Imposition will vary depending on the direction in which the sheet of paper is flipped in order to print on the second side:

sheetwise

also called work and back. Refers to printing different pages on the front and back of a large sheet of paper. Each large sheet yields one finished piece when cut.

work and back

see imposition/sheetwise

work and tumble

prints the same pages on the front and back of a large sheet of paper. Each large sheet yields two or more finished pieces when cut. After the first run, the sheet is tumbled from bottom to top and the back is printed.

work and turn

prints the same pages on the front and back of a large sheet of paper. Each large sheet yields two or more finished pieces when cut. After the first run, the sheet is turned from side to side and the back is printed.
see also backing up, folding, form, make-ready, manufacturing order, signature

impression cylinder

the cylinder or flat bed of a printing press that holds paper while an inked image from the blanket is pressed upon it.
see also offset, planographic

index paper

a stiff, inexpensive paper with a smooth finish. The high bulk but low weight of this paper makes it a popular choice for business reply cards. The basic size of index paper is 251 2" x 301 2".
see also basic size

ingredients of paper

all the materials used to make the mat of fibers known as paper. The one essential ingredient is cellulose fiber. The rest of the ingredients enhance the paper by adding body, reducing cost, or changing color.
see also cellulose fiber, clay, filler, furnish, papermaking, pigment, pulp, resin, sizing

ink

a combination of pigment, pigment carrier or vehicle, and additives. Careful ink formulation by the printer can reduce or prevent smudging, unevenness, picking, and additional printing problems associated with ink. The ink used for a particular job depends on the paper specified and the printing process used.
see also dry trap, tack, UV ink, vegetable-based ink, wet trap

ink absorption

capacity to accept or absorb ink.
see also absorbency, ink holdout

ink holdout

resistance to the penetration of ink. Coated papers tend to have good ink holdout. The ink pigments sit on the surface of the coating, and are not absorbed into the spaces between the paper fibers. This minimizes dot spread and results in a sharp image. Uncoated papers tend to absorb ink into the sheet, but printers can compensate for this and still produce a very bright, sharp image on uncoated paper.
see also coated paper, dot compensation, ink absorption

intaglio

a method of printing in which an image or letter is cut into the surface of wood or metal, creating tiny wells. Printing ink sits in these wells, and the paper is pressed onto the plate and into the wells, picking up the ink.
see also engraving, gravure, printing methods

jog

to shake a stack of papers, either on a machine or by hand, so that the edges line up. Printers jog the paper to get rid of any dust or particles and to ensure proper feeding into the press.

kraft paper

a paper manufactured using kraft pulp and noted for its strength. In the kraft pulping process, fiber is separated from lignin by cooking wood chips with steam and pressure.
see also bleached kraft, lignin, pulping wood

laid finish

a paper with a translucent pattern of lines running both parallel to and across the grain. Laid finished paper is created by dropping a patterned dandy roll onto the paper machine while the paper is still wet.
see also dandy roll, finish

laser compatible

paper that performs well in a laser printer or copier. Laser compatible paper has good dimensional stability that keeps it from curling, changing shape, and causing paper jams in printers and copiers.
see also dimensional stability, xerography

letterpress

a relief printing method. Printing is done using cast metal type or plates on which the image or printing areas are raised above the nonprinting areas. Ink rollers touch only the top surface of the raised areas; the nonprinting areas are lower and do not receive ink. The inked image is transferred directly to the page, resulting in type or images that may actually be depressed or debossed into the paper by the pressure of the press.
see also printing methods, relief

lignin

the natural, glue-like substance that holds together the cellulose fibers of wood plants. Lignin that is left in pulp causes paper to age and yellow over time.
see also acid-free, cellulose fiber, groundwood paper

like-sided

paper that has the same appearance and characteristics on both sides (the opposite of two-sided).
see also twin-wire machine, two-sidedness

linen finish

a paper finish that is similar to the texture of linen fabric. Linen finishes are embossed after the paper comes off the paper machine.
see also embossing, finish

lines per inch

the number of lines in an inch, as found on the screens that create halftones and four-color process images (for example, "printed 175-line screen"). The more lines per inch, the more detailed the printed image will be. With the demand for computer-generated imagery, the term "dots per inch" (which refers to the resolution of the output), is replacing the term "lines per inch."
see also dpi, four-color process, halftone, screen

litho

short for lithography or offset lithography.

lithography

a printing process using flat surface planographic plates (originally stone) that is based on the principle that oil and water don't mix. The image to be lithographed is created on the plate with greasy material that repels water. Water is run over the plate, and the non-image areas absorb it. When the oily ink hits the plate, it's attracted to the similarly greasy image, and repelled by the rest of the wet plate. When paper is pressed onto the plate, it picks up the ink (and a bit of the water). This process is now used primarily for limited-edition art prints.
see also offset, planographic, plate, printing process

M weight

the weight in pounds of 1,000 sheets (or two standard 500-sheet reams) of paper. On the label of a paper ream, the M weight is often given after the dimensions of the paper in the ream: for example, 23" x 29" - 42M. The capital letter M, like the Roman numeral M, designates 1,000; the 42 indicates that 1,000 sheets weigh 42 pounds.
see also basis weight, ream weight, weight

machine coated

paper that is coated on the papermaking machine.
see also coated paper

machine finish

a paper texture or finish imparted onto the paper while it's still on the papermaking machine.
see also felt finish, finish, vellum

make-ready

all the activities involved in preparing a printing press for a print run, such as setting the registration, balancing the color, and adjusting the plates and blankets for paper thickness.
see imposition, impression cylinder, plate, printing methods, registration

making order

see manufacturing order

manufacturing order

also known as making order. A quantity of paper manufactured to custom specifications, such as a special weight, color, or size not available as a standard stocking item. Special order requirements are necessary and should be discussed with a local paper consultant.
see imposition, paper consultant, stock

match color

a custom-blended ink that matches a specified color exactly. Match colors are used to print line copy and halftones in one, two, three, or occasionally more colors. The specified colors are chosen from color systems. The most widely used systems are the PANTONE MATCHING SYSTEM®, Colorcurve, and Toyo.
see also Colorcurve, PANTONE MATCHING SYSTEM®, Toyo

matte coated

a non-glossy coating on paper, generally used to refer to papers having little or

no gloss. A matte coated sheet is often specified when the printed pages will carry a lot of type, since the low gloss makes for easier reading.
see also coated paper, dull coated, finish, gloss

mechanical pulping

separating wood fibers for pulp by grinding wood chips mechanically, rather than by using a chemical process.
see also pulping wood

mechanical binding

see binding

merchant

a distributor of papers, often representing several different paper mills or manufacturers.

metamerism

the tendency of color to change with the light source in which it's viewed. For example, two reds may appear to match under fluorescent light, but clash badly in the light of the sun.

mill

the physical site where paper is manufactured; also refers to a company that manufactures paper.

mill broke

paper generated at the paper mill prior to completion of the manufacturing process. Wet mill broke originates at the wet end of the papermaking machine, while dry mill broke comes from the dry end of the papermaking machine.
see also dry end, wet end

moiré

a pattern created by printing several repetitive designs on top of each other. In four-color process printing, four screens of colored dots print on top of each other. If the angles of the halftone screens of each of the four colors are not properly aligned with each other, an undesirable, blurry pattern called "moiré" appears in the final image; the term is from the watery or wavy pattern seen on moiré silk.
see also four-color process, halftone, rosette, screen

municipal solid waste (MSW)

residential, commercial, institutional, and some industrial solid wastes, excluding sewage.

newsprint paper

a grade of paper made primarily from groundwood (mechanical) pulp rather than chemical pulp, resulting in a short lifespan. Newsprint is one of the least expensive printing papers.
see also groundwood paper, pulping wood

notched binding

see binding

office reprographic paper

commonly referred to as reprographic paper, includes a variety of business paper grades (both cut-size and copier rolls) like bond, mimeo, duplicator, and reproduction papers.
see also bond paper, electronic printing, xerography

off-machine coating

coating paper after it comes off the papermaking machine rather than while it is still on the machine. Off-machine coaters may be used to add a single layer of coating to a paper or to add a second layer to a paper that has already been machine coated.
see also coated paper

offset

an indirect printing process. Ink is transferred to paper from a blanket that carries an impression from the printing plate, rather than directly from the printing plate itself. Generally, when we say "offset" we mean "offset lithography," even though other printing processes, such as letterpress, may also use this indirect technique.

The term offset (or "set off") can also refer to the smudges created when ink from one printed sheet transfers to another. Offset spray is used to prevent this.
see also impression cylinder, lithography, planographic, plate, printing processes

offset papers

book and text weight papers that are made to withstand the rigors of offset printing. These papers are more resistant to water and less susceptible to picking. Most book and text grades of paper can be used on offset presses. Often the term "offset" is used synonymously with "book." The basic size of offset papers is 25" x 38".
see also basic size, book papers, picking, text paper

opacity

a measure of how opaque a paper is. The more fibers or fillers a paper has, the

more opaque it is, and the less it allows "show-through" of the printing on the back side or on the next page. Opacity isn't always determined by thickness or weight; a thinner paper may have more opacity than a thicker paper if opacifying thickeners are used.
see also calcium carbonate, fillers, thickness, titanium dioxide, weight

oxygen delignification

a processing step that takes place after pulping and before bleaching. Oxygen is used to remove lignin (delignify), resulting in lower chemical usage in the bleach plant.
see also bleaching, lignin

pallet

a platform with a slatted bottom, used to hold and ship cartons of paper stacked on top of each other.

PANTONE MATCHING SYSTEM®*

the most widely used system for specifying and blending match colors. The PANTONE MATCHING SYSTEM identifies more than 1000 colors. It provides designers with swatches for specific colors and gives printers the recipes for making those colors.

The PANTONE MATCHING SYSTEM was developed by neither a commercial printer nor an ink manufacturer, leaving the choice of ink brand up to the printer.

Pantone, Inc.'s check-standard trademark for color
see also Colorcurve, match color, Toyo**

paper

a complex matted web of cellulose fibers.

paper consultant

a representative from a paper mill or merchant who has the expertise to help designers and printers choose just the right paper for a specific job.
see also manufacturing order, merchant, specifying paper

paper cut

the excruciating, often unforeseeable, and usually invisible-to-the-naked-eye cut received when skin slides along the edge of a piece of paper at just the wrong angle.

paperboard

paper with a caliper greater than .012 inches, or 12 points. Paperboard is used primarily for packaging and construction materials. Paperboard doesn't need the same whiteness and brightness as premium printing and writing papers, and because the process of deinking is less important in its manu- facture, it is a perfect product for using recovered fiber.
see caliper, deinking

paper-ink affinity

the tendency for paper and ink to attract and stay attracted to each other. This keeps the ink on the paper and off the reader's hands or the next sheet. An incompatibility between ink and paper can cause printing problems.
see also dry trap, ink, tack, wet trap

papermaking

creating a web of fiber from plant cellulose (or, less commonly, from synthetic fibers). Papermakers today follow the same steps that its inventor, Ts'ai Lun, followed almost two thousand years ago: pulping vegetable matter and leaving the cellulose fibers behind, mixing the pulp with lots of water, draining it, forming paper on a sieve-like mold, pressing the paper to remove some of the water, and drying it to remove the rest of the water. Technology has sped up the process and helped to improve the smoothness, brightness, and printability of the paper, but it hasn't changed the essence of papermaking.

Papermaking begins with pulping: breaking wood apart into its individual cellulose fibers. Most wood is pulped with chemicals that help dissolve impurities. The pulp is then washed to remove solid impurities, like lignin and other naturally occurring materials.

Bleaching is the next step for some (not all) papers; it lightens the color of the pulp. Beating or refining then flattens, frays, and shortens the cellulose fibers. Pigments, sizing, and fillers are added to the pulp at this point, along with huge amounts of water. Slurried pulp entering the papermaking machine is more than 99% water, making it easy to spread and form on the wire (forming fabric) of the machine.

Paper forming begins when the prepared pulp is spread onto the continuously moving forming fabric of the Fourdrinier. As the slurry spreads onto the form, the form shakes from side to side, distributing the fibers and creating a tangle of fibers. This shaking causes turbulence on the surface of the slurry, which, if not controlled, can lead to an uneven paper surface with spots, holes, and bubbles. A wire mesh roller moves over the surface for the purpose of controlling the turbulence. The greater the roller pressure, the smoother the top side of the paper. This roller is called a dandy roll, and it may carry the design for a watermark.

The web of paper moves off the forming fabric and onto felts that absorb water from the paper; it then moves through presses to have more water squeezed out of it. The pressure between the two rolls of the presses can be used to increase or decrease any two-sidedness the paper may have developed on the wet end. At this point the paper is dry, and may be coated or calendered before rolling and cutting.
see also additives, alkaline papermaking, calendering, chemical pulping, deinking, dry end, drying, felt finish, felt side, finish, Fourdrinier, grain, ingredients of paper, lignin, pulping wood, semi-chemical pulping, supercalender, wet end, wire side

papyrus

an aquatic plant found in northern Africa. Although papyrus is considered to be the first paper, it is not. In the strict definition of the word, paper is a matted web of individual fibers. Rather, early papyrus "paper" was made by peeling the plant, which is constructed like an onion, and placing one layer on top of another. The natural juices acted like glue, bonding the layers and leaving the cellular structure of the plant layers intact.

see also scrolls

parchment

a writing substance made from the skin of animals. Today, parchment-like paper, or vegetable parchment, is made by dipping paper into sulfuric acid, then quickly washing it and neutralizing the acid. This process melts the fibers on the outside, which in turn coat the other fibers and fill voids between them. The result is a grease-resistant sheet that is difficult to recycle.

perfect binding

see binding

perfecting press

a printing press that simultaneously prints both sides of a sheet of paper as it passes through the press. On other presses, printing both sides means running the sheet through the press to print one side, allowing the ink to dry, turning the paper over, and then running the sheet through the press again to print the other side.
see also imposition, printing methods

permanence

a paper's ability to resist tears, fading, and general aging over time. The national standard for permanence requires a pH of 7.5 to 8.5; at least 2% calcium carbonate; and no groundwood or unbleached fiber. The standard also has specific fold endurance and tear resistance requirements. Paper meeting the standard for permanence can be expected to last more than 100 years. Paper with a pH level of 5.5 or higher can be expected to last up to 50 years.
see also alkaline papermaking, archival paper, pH

petroleum-based ink

an ink using petroleum as the vehicle for carrying the pigment. Ink manufacturers are seeking new vehicles to reduce the need for petroleum-based solvents, which may be toxic at high levels.
see also ink, vegetable-based ink

pH

the measure of the acidity or alkalinity of a material. Paper with a pH below 7.0 is considered acidic; paper with a pH above 7.0 is considered acid-free, or alkaline.
see also acid-free paper, alkaline papermaking, archival paper

pick out

a problem on press caused by unevenly sealed paper, or paper with low bonding strength. The ink "picks" off weak areas of the paper, lifting coating from a coated stock or lifting fibers from an uncoated stock, and transferring them to the

printing blanket.

These fibers will eventually be transferred back onto the sheets being printed, causing inking and surface inconsistencies.
see also bonding strength, hickey, picking, sizing

pick resistance

the ability of paper fibers to hold together during the printing process.
see also bonding strength, pick out, sizing

picking

a problem generally resulting from using an ink that's too tacky for the paper it's printed on. The ink actually pulls tiny pieces of the paper off the surface of the sheet.

Two types of picking are fiber bundles and coating picking. Fiber bundles are caused by weak fiber bonds and coating picking occurs when the adhesive properties of coating binder cannot stand up to the high tack of the offset printing process.
see also bonding strength, pick out, sizing

pigment

a material, such as titanium dioxide, added to pulp before it is formed into paper. White pigments boost brightness and opacity; colored pigments and dyes control the shade or change the color.
see also fluorescent dye, ingredients of paper, opacity, titanium dioxide

planographic

a method for printing ink onto paper, where the image sits on the same surface as the printing plate. The image area is greased to attract ink, while the rest of the plate attracts water and repels ink. As the paper is pressed onto the flat surface of the plate, it picks up ink from the greasy image areas and a small bit of water from blank areas. This is the printing process used in lithography and offset lithography.
see also lithography, offset, plate, printing methods

plate

short for printing plate, generally a thin sheet of metal that carries the printing image. The plate surface is treated or configured so that only the printing image is ink receptive.
see also electronic printing, intaglio, letterpress, lithography, offset, planographic, printing methods, relief

point

in measurements of the thickness of paper, one point is 1/1000 or .001 inches; in

measurements of the size of type, one point is 1/72 inch.
see also caliper, thickness

porosity

refers to the openness or compactness of the fibers in a paper, as measured by the ability of air to pass through the sheet. The more open a paper is, the greater its porosity.

post-consumer recovered paper

paper material recovered after being used by a consumer.
see also recovered paper, recycled content paper, recycled paper

ppi

pages per inch, or the number of sheets in a one-inch stack of paper; used to describe the bulk of a paper.
see also bulk, caliper, thickness

precision sheeting

converting rolls of paper into finished sheet sizes in a single operation.

pre-consumer recovered paper

paper recovered after the papermaking process, but before use by a consumer.
see also recovered paper, recycled content paper, recycled paper

press proof

a test printing of a subject prior to the final production run. Press proofs are generally printed on the paper stock that will be used for the finished project. A few sheets are run as a final check before printing the entire job.

print quality

the overall excellence of a printed piece. Paper, ink, press, and the skill of the press operators all affect print quality.
see also printability

printability

how well a paper performs with ink on press. Absorbency, smoothness, ink holdout, and opacity all affect printability.
see also absorbency, dimensional stability, ink holdout, opacity, relative humidity

printing

transferring ink onto paper or other materials to reproduce words or images.
see also printing methods

printing methods

the means for placing ink on paper. Most printing is done with a plate. The four main types of printing methods are relief, where words or images are raised above the surface of the plate; intaglio, where they are etched below the surface; planographic, on the same plane as the surface; and stencil, or screen printing, cut through the plate. Words and images may also be "printed" electronically, using photocopiers and inkjet printers.
see also electronic printing, intaglio, letterpress, lithography, offset, planographic, plate, relief, screen printing, stencil, waterless printing, web press

process colors

the four process colors - magenta (process red), cyan (process blue), yellow, and black - used to print four-color images.
see also color separating, four-color process, subtractive colors

pt.

abbreviation for "point."
see also point

pulp

a wet slurry of fibers and water that is the basic ingredient of paper.
see also cellulose fiber, pulping wood, slurry, wet end

pulping wood

transforming wood, the raw material of most paper, into pulp. Pulping breaks wood apart, separating the rows of cellulose fibers that are stuck together with lignin. These separated fibers will later create the matted web of fibers we know as paper. Paper may be made with pulp from just one of the following processes or by mixing mechanical and chemical pulps.

mechanical pulping

grinding logs or wood chips to break them into short fibers. The impurities (mainly lignin) that cause paper to yellow, crack, and disintegrate over time are left in the pulp. Mechanical pulp is used primarily for newsprint.

thermo-mechanical pulping

using steam under pressure to soften wood chips before they are mechanically ground. Using steam separates the cellulose fibers better than grinding alone, creating a grade of paper superior to that which mechanical pulping produces.

chemical pulping

cooking wood with chemicals to separate the cellulose fibers. This process dissolves lignin and is used to manufacture freesheet papers.
see also cellulose fiber, freesheet, groundwood paper, lignin, papermaking

quadratone

a black-and-white image printed with four screens and four colors, such as one or more blacks and different shades of gray; used to enrich the contrast between light and dark areas.
see also continuous tone, duotone, halftone, screen, tritone

rag paper

paper with at least 25% and as much as 100% cotton fibers.
see also cotton paper

ream

a package containing 500 sheets of printing paper.

ream weight

the actual weight in pounds of a ream (500 sheets) of paper.
see also actual weight, basis weight, weight

recovered paper

paper that has been separated, diverted, or removed from the solid waste stream.
see also municipal solid waste, recyclable, recycled content paper, recycled paper

recyclable

suitable for recycling. This term may be misleading. For example, it may be physically possible to recycle a given material, but if it is too costly to do so, or if a collection process is not in place, recycling may be impossible or economically not feasible.

recycled content paper

a paper product containing some, but consisting of less than 100% recovered fiber.
see also deinking, pre-consumer recovered paper, post-consumer recovered paper, recycled paper

recycled paper

a paper product consisting of 100% recovered fiber. Recovered fiber includes pre- or post-consumer sources or both.
see also deinking, pre-consumer recovered paper, post-consumer recovered paper, recycled content paper

refining

the process of cutting, breaking, and flattening the cellulose fibers in pulp. In order to form a strong, flexible paper, pulp fibers need to be flattened and frayed. The refining machine has metal discs that can be adjusted to create longer or shorter fibers.
see also hydropulper, papermaking

refractiveness

a measure of how much a sheet of paper deflects the light that hits it. The more

light a sheet deflects, the greater its refractiveness, allowing a printed image to be more brilliant and detailed.
see also brightness, whiteness

registration

putting two or more images together so that they are exactly aligned and the resulting image is sharp.
see also dimensional stability, relative humidity balance

relative humidity balance

the relative humidity of the pressroom compared to the relative humidity of the paper to be printed. Relative humidity is a measure of how much moisture air or paper can hold versus how much it is actually holding at a given temperature. Before printing a job, the printer must "cure" the paper by letting it sit, wrapped, in the pressroom for a determined amount of time. This will bring the paper to the same temperature and humidity as the pressroom, helping to prevent several printing problems. For instance, ink on cold paper takes longer to dry than ink on room-temperature paper. Ink on dry paper may "chalk" if the dry paper absorbs the liquid in the pigment before the solid pigments adhere to the paper. Paper with too much humidity will expand, causing it to wrinkle on press. This can cause misalignment and a lack of registration in the printing.
see also registration

relief

a method for printing ink on paper, using type or images that rise above the surface of the printing plate. Ink sits on top of these raised surfaces, and as the paper is pressed onto them it picks up ink. Letterpress, flexography, and rubber stamps all use relief plates. In letterpress, intense pressure can cause images to be slightly debossed or depressed below the surface of the paper.
see also flexography, letterpress, plate, printing methods

reprographic paper

see office reprographic paper

resilience

the ability of paper to return to its original form after being stressed by bending, stretching, or compressing during the printing and finishing processes.
see also bonding strength, dimensional stability, runnability, tensile strength

resin

a generic term referring to the materials used by paper manufacturers to "size" paper. Rosin, a natural resin from pine trees, is used in the manufacture of acidic paper. Synthetic resins are used in the manufacture of alkaline and acid-free papers.

see also acid-free, alkaline papermaking, alum, ingredients of paper, rosin, sizing

rosette

the formation created by the dots that make up four-color images. The dots, in magenta (red), cyan (blue), yellow, and black, overlap each other in a cluster. Because the dots are not perfectly round, and because they are turned at angles to each other, this cluster resembles the arrangement of petals in a rose.
see also four-color process

rosin

a natural resin from pine trees, used to size acidic paper.
see also ingredients of paper, resin

runnability

the ease with which a paper moves through a printing press. For example, offset lithography puts more stress on paper than other printing processes because of how the paper moves through the press, the great amount of water used in the process, and the tackiness of the inks. In order to have good runnability, paper for offset printing must be strong, have great tear resistance, and possess good dimensional stability. It must also be water resistant and have a strong surface so that the paper doesn't pick. Runnability is also a term for measuring the number of mechanical web breaks per 1,000 rolls of paper run on a press.
see also dimensional stability, offset, printability

saddlestitch

see binding

scoring

pressing a channel into a sheet of paper to allow it to fold more easily. Scoring and pressing the paper fibers together creates an embossed channel that acts as a guide for easier folding and creates a hinge that keeps the fiber stretch short.

The score should run parallel to the paper grain; the thicker the paper, the wider the score should be. Paper should be folded with the scored side on the outside, making two short stretches rather than one long one. The outcome is a straight, durable fold that doesn't crack or break.
see also finishing, folding, grain

screen

the lined glass, now called contact film, through which images are photographed to create halftones. Shooting through the mesh of a screen breaks an image into tiny dots. The closer the lines of the screen, the smaller the dots and the more dots per inch; the farther apart the lines of the screen, the bigger the dots and the fewer dots per inch. The higher the dots per inch, the smaller the dots are, therefore creating a finer, crisper image.

The coarseness or fineness of the screen is measured in the number of horizontal and vertical lines per inch. The less a paper absorbs and spreads ink, the finer the screen that can be used. Newspapers use coarse screens with 55 to 85 lines per inch. Most trade publications use 85 to 110 lines. With traditional printing, a coated paper can hold the small dots from a 200-line screen. With waterless printing, the paper can hold the dots from an even finer screen - 400 lines and greater. Though this approaches the quality of continuous tone, it is hard for the eye to discern the differences in resolution above 200 lines per inch.
see also absorbency, continuous tone, dot gain, dpi, stochastic

screen printing

a printing process also called silk screening, where ink is transferred through a porous screen, such as nylon, onto the surface to be decorated. An emulsion or stencil is used to block out the negative or non-printing areas of the screen. A squeegee forces ink through the open areas of the screen and onto the paper, plastic, cardboard, wood, fabric, glass, or other material.
see printing process, stencil

scrolls

long sheets of papyrus, parchment, or paper rolled for storage.
see also papyrus, parchment

self cover

a booklet having a cover made of the same paper as the inside or text pages.

semi-chemical pulping

using chemicals and mechanical grinding to separate the cellulose fibers of wood. Because this pulping process doesn't remove lignin, it isn't generally used for fine printing and writing papers. It's used instead for papers not requiring permanence.
see also pulping wood, cellulose fibers, lignin

shade

the color depth and hue in comparison to papers that are the same color; also used to describe the color achieved by adding dye to pulp slurry. There is a wide shade variety in white papers, as well as in colored papers.

sheet-fed press

a press that prints single sheets of paper, rather than a continuous roll or web of paper. A sheet-fed press prints more slowly than a web press, and is typically used for shorter runs.
see also offset, web paper, web press

sheetwise

see imposition

Sheffield

a test used to measure the smoothness of paper by measuring the rate of air flow over the surface of the sheet. The lower the number, the smoother the sheet.
see also smooth finish, smoothness

show-through
see opacity

signature

the collated pages of one folded and trimmed form, making up one section of a bound book.
see also binding, form, imposition, trimming

silk screen

see screen printing

sizing

a resin, such as rosin, added to pulp before it's formed into paper or added to the surface of the paper after it's dry. Sizing acts as a glue to keep the fibers of the finished paper tight, since loose fibers on the surface of the paper can cause printing problems. Sizing also helps the finished paper repel water, which is an

important property for stock that will be used for offset printing.
see also bonding strength, ingredients of paper, resin, rosin

skid

a platform built with a solid wood bottom, for holding stacks of paper not packed in cartons. Paper may be ordered in skids or cartons. When printers are printing a large job, they generally prefer skids to cartons.

slurry

a thin, watery mixture. The mixture of pulp and water that is poured onto the papermaking machine is often referred to as slurry.
see also headbox, hydropulper, papermaking, wet end

smooth finish

paper finished to a Sheffield smoothness between 50 and 150.
see also finish, Sheffield, smoothness

smoothness

the surface property of paper that describes its degree of uniform evenness and flatness. When printing, the smoother the paper, the better the ink dot formation and the sharper the image.
see cast-coating, coated paper, Sheffield, smooth finish, supercalender, uncoated paper

softwood pulp

pulp made from coniferous trees (evergreen trees with cones and needles, such as pine and fir trees). Paper is often made using a blend of pulps: softwood pulp has long fibers, giving paper strength; hardwood fibers are short, lending smoothness, bulk, and body.
see also hardwood pulp, pulping wood

specifying paper

choosing the appropriate paper for a specific printing job in order to meet its individual design, printing, handling, and economic requirements. Designers and printers are frequently assisted by a paper merchant or a paper mill consultant when choosing a paper.
see also paper consultant

stencil

a sheet of plastic, paper, or other material with letters or an image cut out of it. When placed on a surface and inked, it reproduces the cut-away images onto the material behind it.
see also printing methods, screen printing

stochastic

a relatively new method for creating halftones. Rather than producing the regularly spaced dots of lined screens, stochastic screening generates randomly placed dots. Because the generation of the dots is frequency modulated, the technique is also called FM screening. Registration on press is slightly more difficult than with lined screens, but the color results can be brilliant.
see also continuous tone, dpi, halftone, registration, screen

stock

paper or other material that will be printed. To a paper mill, a "stock item" is a manufactured item that is inventoried, as opposed to a "manufacturing order," which is custom made.
see also manufacturing order

subtractive colors

the three primary process printing colors: magenta, cyan, and yellow, as opposed to the three additive primary colors of green, red, and blue. Color separations are created by shooting or scanning a color through filters of additive colors to generate halftones of subtractive colors. Subtracting the additive color of green from white light leaves magenta; subtracting red leaves cyan; and subtracting blue leaves yellow. The subtractive color halftones are then combined on a printing press to create full-color images.
see also color separation, four-color process, halftone

supercalender

a set of alternating steel and fiber-covered calender rolls that increase a sheet's gloss and smoothness. The supercalender is a separate piece of equipment located close to the dry end of the paper machine.
see also calendering, gloss, papermaking, smoothness

swatchbook

a booklet containing paper samples and paper specifications for a line of paper.

tack

stickiness. Tack is a critical property of the ink used in lithography. Because the ink sits on a flat surface, it needs internal cohesion; in other words, it needs to stick to itself so that it doesn't run all over the plate. However, too much tack can cause it to pull the paper apart.

When printing two or more ink colors in line, the ink tack and sequence must be adjusted in order for the inks to adhere to each other as well as to the paper.
see also dry trap, lithography, plate, wet trap

tag paper

a heavy utility grade of paper used to print tags, such as the store tags on clothing. Tag paper must be strong and durable, yet have good affinity for printing inks.

tear strength

a measure of how likely a paper will continue to tear once started. Tear strength will be different with and against the grain of paper. Paper that will be punched should have good tear strength.
see also bonding strength, grain

tensile strength

a measure of how likely a paper is to break when pulled at opposite ends, in opposite directions. A web offset paper must have good tensile strength if it is to withstand the high speed of the printing press.
see also bonding strength, web break, web paper, web press

text paper

premium uncoated printing paper of fine quality, manufactured in weights suitable for the text of books or brochures. Text papers are made in a wide variety of finishes, including smooth, antique, vellum, laid, felt, and embossed. They are characterized by excellent folding qualities, printability, and durability.

Text papers are used most often for books, annual reports, brochures, booklets, advertising collateral material, and announcements and have a basic size of 25" x 38".
see also basic size, book paper, cover paper, offset paper

thermography

a finishing applied after printing that creates the raised effect of engraved printing. Special inks are used during offset printing. A powder is then applied to the paper and the paper is passed through a heater. The powder fuses to the ink, but not to the unprinted areas of the paper, and swells as it's heated,

creating raised letters and images.
see also engraving, offset, printing methods

thickness

the thickness of a single piece of paper, as measured in thousandths of an inch, called "caliper." Thickness measurements define the bulkiness of a sheet of paper, but the actual number of sheets in an inch-high stack of paper is referred to as PPI, or pages per inch.
see also bulk, caliper, ppi

tint

to vary a color by adding white. Also, a very light or delicate variation of a color.

titanium dioxide

an opaque and expensive compound used as a white pigment and opacifier in papermaking. Elemental titanium is a lustrous, lightweight, white metal with exceptional strength.
see also ingredients of paper, opacity, pigment

tooth

refers to paper's surface roughness, a characteristic that allows it to take up ink.

touchplate

in four-color process printing, an additional fifth plate of ink that adds more of one color to enhance the image.
see also four-color process, subtractive color

Toyo*

a system used for color matching.
see also Colorcurve, match color, PANTONE MATCHING SYSTEM®*

trapping

printing ink over previously printed ink. Trapping is also used to describe the very slight overlapping of adjacent colors.
see dry trap, tack, wet trap

trim size

the final size of a printed piece once it has been cut to specification.

trimming

cutting paper after printing to make all sheets the same or a specified size. The inner pages of each signature have a tighter fold and will be slightly longer than

the outer pages. After binding printed pages, the head, foot, and edge of a book are often trimmed in a guillotine to make all the pages even.
see also finishing, guillotine, signature, trim size

tritone

a black and white image printed with three screens and three colors - such as one black and two grays - used to enrich the contrast between light and dark areas.
see also continuous tone, duotone, halftone, quadratone, screen

twin-wire machine

a papermaking machine with two continuous forming wires, rather than just one. Twin-wires were designed to create a less two-sided paper than paper manufactured on a Fourdrinier paper machine.

Other techniques for reducing two-sidedness have since been developed, enabling paper manufacturers to create paper on single-wire machines with little side-to-side variation.
see also felt side, Fourdrinier, two-sidedness, wire side

two-sidedness

the tendency of some papers to have slightly different characteristics and printing results from side to side.
see also felt side, like-sided, wire side

uncoated freesheet

uncoated paper containing no more than 10% mechanical wood pulp. Most uncoated freesheet paper is entirely free of mechanical wood pulp. Most uncoated printing and writing papers are classified into the broader category of uncoated freesheet.
see also mechanical pulp, pulping wood, uncoated paper

uncoated groundwood

all uncoated paper that contains more than 10% groundwood fiber in its furnish.
see also furnish, groundwood paper, newsprint paper, uncoated paper

uncoated paper

paper that doesn't have a coating. Uncoated papers are manufactured in a great variety of finishes, colors, and weights and offer the versatility needed to meet the creative and practical demands of most print jobs.
see also book paper, cotton paper, cover paper, furnish, offset papers, text papers, vellum

UV coating

a very slick, glossy coating applied to the printed paper surface and dried on press with ultraviolet (UV) light. The slick surface of UV coating makes it eye catching and very popular for printing the covers of paperback novels. Because UV coating can cause slight variations in match colors, consulting with an ink manufacturer or printer will yield best results.

UV ink

ink specially formulated to dry quickly with ultraviolet (UV) light while still on press. UV drying improves turnaround time because it eliminates waiting for the first side to dry before printing the second side. This eliminates the need for the paper to pass through the press more than once.
see also dry trap, ink, wet trap

varnish

a coating printed on top of a printed sheet to protect it, add a finish, or add a tinge of color. An entire sheet may be varnished, or certain areas - like halftones - may be spot varnished to add emphasis and appeal.

vegetable-based ink

an ink using vegetable oil, rather than petroleum solvents, as the vehicle for carrying pigment. Vegetable ink colors tend to be more vibrant than petroleum-based inks, but may take longer to dry.
see also ink, petroleum-based ink

vellum

an uncoated paper finish that is fairly even but not quite as even as a smooth finish. Vellum is one of the most popular uncoated paper finishes.
see also finish, uncoated paper

virgin fiber

fiber that has never been used before in the manufacture of paper or other products.

washing

see deinking

waterless printing

a printing process that runs on offset lithography presses but without using water. The non-image areas of the plate are coated with silicone, allowing the ink to run off freely into shallow wells in the plate. Because finer dots can be used in waterless printing, the image is very detailed. The cost for this printing process is high, but the results can be magnificent.
see also dryography, offset, plate

watermark

a mark in fine papers, imparted during manufacture, that identifies a paper. It doesn't leave an impression in the paper; rather, it leaves behind a translucent mark.
see also dandy roll

web

a roll of paper.
see also web paper

web break

a tear through a roll of paper, occurring either while it is being manufactured at the mill or while it is running through a printing press. When the web breaks, either at the mill or on press, the machinery must be shut down, causing the loss of production time.
see also papermaking, web paper, web press

web paper

paper that comes in a roll rather than in sheets. This is used on a web press, which can fold and cut the paper after printing.

web press

a press specifically designed to print rolls of paper called webs, rather than sheets. A web press runs much faster than a sheet-fed press - as many as 40,000 images per hour versus a maximum of about 14,000 per hour on a sheet-fed press.
see also offset, sheet-fed press, web, web paper

weight

the tonnage or poundage of a quantity of paper. The weight of paper may be expressed as basis weight, ream weight, M weight, or grammage.

Basis weight is the weight in pounds of 500 sheets of paper cut to a given standard size (called basic size), such as 25" x 38", depending on the grade of paper. Ream weight is the actual weight in pounds of 500 sheets of paper, regardless of basic size or grade. M weight is the actual weight of 1,000 sheets of paper. Because this is twice the quantity of a ream of paper, it is also twice the ream weight.

Grammage is a metric measure similar to the basis weight of paper. Unlike basis weight, which uses different basic sizes for different grades of paper, grammage always uses the same sheet size - one square meter - regardless of the paper grade.
see also actual weight, basic size, basis weight, grammage, M weight, ream weight

wet end

the front end of the papermaking machine, including the headbox, wire, and presses. Paper is more water than fiber inthis section of the machine.
see also dry end, headbox, papermaking, slurry

wet trap

printing a layer of wet ink over, or adjacent to, a previous layer of wet ink.
see also dry trap, tack, trapping

whiteness

a measure of the amount of light reflected from a sheet of paper. How white a paper is depends on how evenly it reflects all colors in the visible spectrum. If it reflects more blue than red and yellow, it will have a cool, blue tinge to it, making it appear brighter than white. A cool paper will appear brighter than a similar paper with a warm tinge.

A cool or a warm tinge doesn't affect paper quality, but it does create optical impressions. For example, in color printing with blues and blacks predominating, a cool white sheet tends to brighten the colors. But in color printing with reds, oranges, and yellows predominating, a neutral or warm white sheet tends to make the colors appear clearer and stronger.
see also brightness, fluorescent dye, refractiveness

wire side

the bottom side of the paper that comes in contact with the wire (now called the forming fabric) of the paper machine during the papermaking process. The top side of the paper is called the felt side.

As the water drains through the wire during manufacture, it carries fibers, fillers, and other chemicals with it, depositing more of them on the wire side than on the felt side of the paper. This can result in the wire and felt sides having slightly different textures.

see also felt side, papermaking, tooth, two-sidedness

work and back

see imposition

work and tumble

see imposition

work and turn

see imposition

wove finish

uncoated paper that has an even finish with a slight toothiness.
see also finish, tooth

xerography

the printing process used by photocopying machines. Electric charges create the image on an electrophotographic surface that works as a plate. This surface is cleared after each copy is made and used over again for the next copy.
see also electronic printing, electrophotography, laser compatible, plate, printing process

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