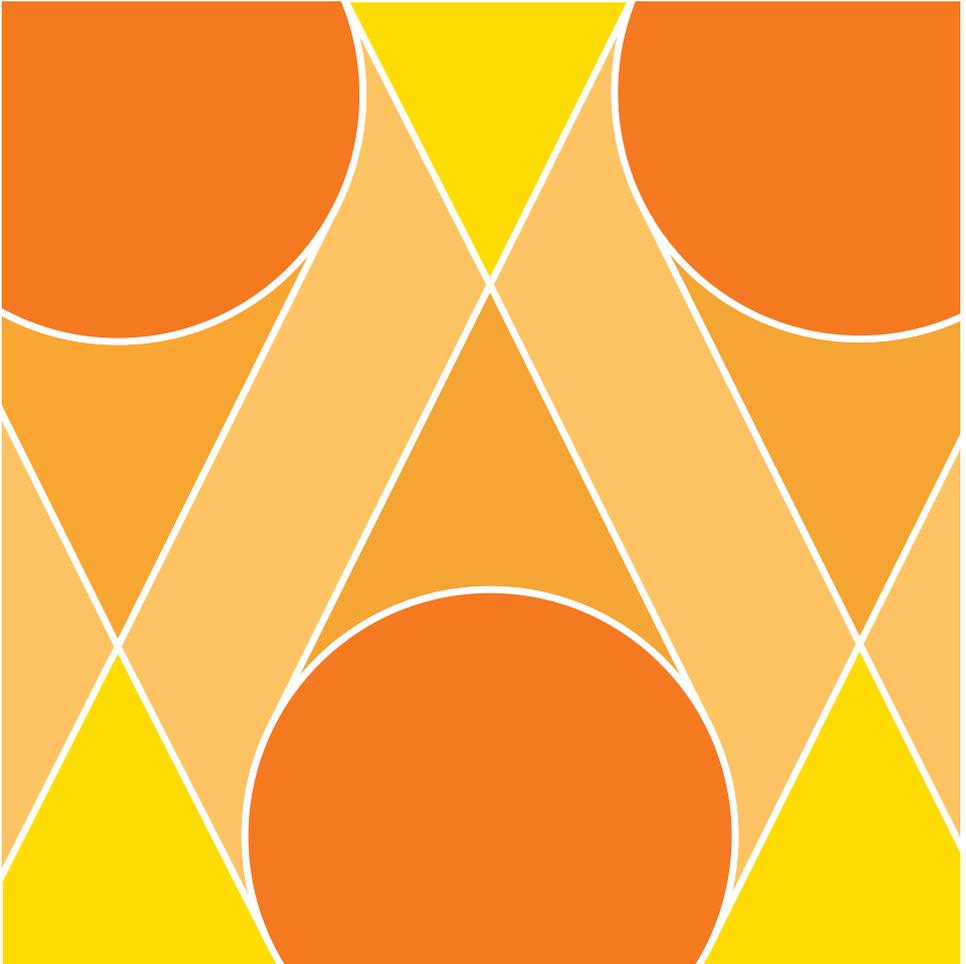# HOT

Cool Solutions for Business

PAPER BASICS

**PAPERMAKING
TYPES
TRAITS
WEIGHTS
SIZES
SWATCHBOOKS
DEFINITIONS
SPECIFYING**

Paper is where design leaps off of the screen and into your hands.

After hours of designing in a two-dimensional virtual reality, you eventually have to take your plan to the third dimension of a printed piece. Making that leap requires paper: tactile, touchable, feel-good paper. Specifying the right paper to realize your vision affects the look and feel of the final product just as much as the colors, fonts, images and layouts you select.

Even without ink paper communicates. The way paper feels is called its hand. Hand affects how the pages turn and how panels fold out. From a bulky cover to a crisp sheet of letterhead, to supple pages in a book, the paper's hand makes a statement. Paper also plays into the overall look of a piece. It can be slick or silky, loud or understated. It can have eye-popping gloss or an honest, authentic appeal. Paper Basics will help you understand the many factors to consider in your decision.

PAPER BASICS
PULP

Paper, whether produced in a modern factory or by hand is made up of connected fibers. Paper is primarily made from wood but it can also be made from linen, cotton or other cellulose fibers from plants. In the most simple terms paper is made by softening, or mixing, vegetable fibers in hot water until they are an evenly blended mixture called pulp. The pulp is diluted and distributed over a screen to allow the water to drain out. The result is a layer of interlaced fibers known as paper.

Most fiber today comes from wood that has been purposely harvested for the paper industry. A combination of hardwood (from deciduous trees) and softwoods (from coniferous trees) are used based upon the desired properties of the finished sheet. In the pulp mill, the bark is removed and the wood is cut up into small chips. These chips are cooked with chemicals under pressure in digesters to separate the fibers. The resulting pulp is washed, cleaned and bleached and is delivered to the paper mill as pulp. Non-integrated paper mills don't have a pulp mill, so they purchase all the pulp they require.

At the mill the pulp is mixed with water in a large blender called a pulper. Various materials including broke (trimmings and waste from the papermaking industry), postconsumer waste fibers (though they cannot be reused forever), dyes, colorings, fillers and sizings may be added. Additives to the pulp enhance ink holdout, improve whiteness and increase opacity.
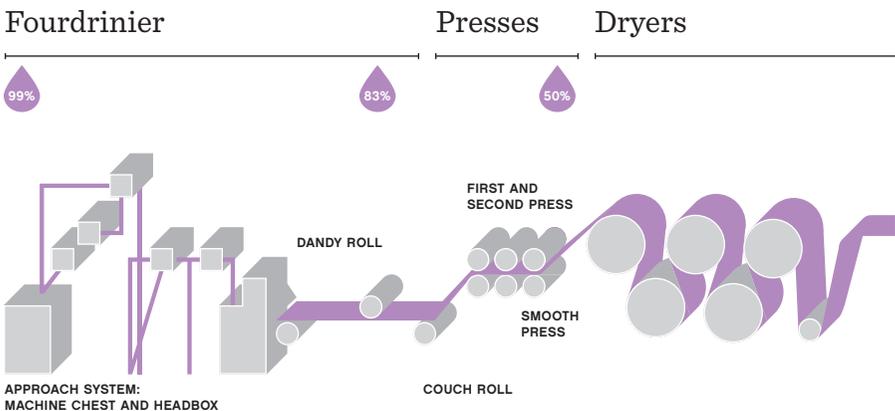
PAPER BASICS
PAPERMAKING

In order to turn the pulp into paper, the pulp is pumped into large automated machines such as the Fourdrinier machine. The Fourdrinier machine, invented near the dawn of the 19th century, remains the basis of modern continuous papermaking. In the Fourdrinier diluted pulp is distributed onto a moving belt of fine mesh screening called a wire where the fibers blend together as the water drains out, forming a sheet of paper.

The forming sheet of paper is passed under the dandy roll, mixing the fibers one last time before they set in place. The dandy roll can change the appearance of the sheet by imparting laid lines or a watermark.

Grain direction in paper is determined by the flow of paper on the machine. 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).

The paper moves onto a felt material and is pressed between a series of rollers in the press section. The top, or felt side, of the sheet is in contact with the felt and the bottom, or wire side, is in contact with the forming wire. The press section removes water and the paper then passes through steam heated rollers called dryer cans to evaporate more water. The dry paper is rolled up on large reels and prepped for finishing.

Fourdrinier   Presses   Dryers

99%   83%   50%

FIRST AND
SECOND PRESS

DANDY ROLL

SMOOTH
PRESS

APPROACH SYSTEM:
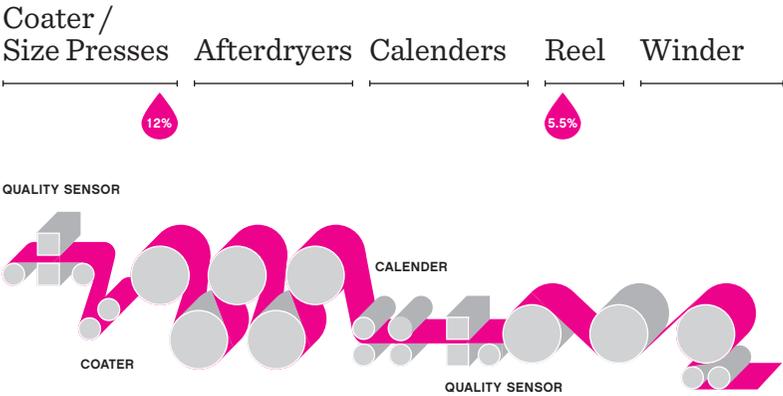MACHINE CHEST AND HEADBOX

COUCH ROLL

PAPER BASICS
FINISHING

In finishing the paper is treated for specific uses. The paper is smoothed and compacted by passing through metal rollers called calenders. A particular finish, whether soft and dull or hard and shiny, can be made by the calenders. The paper may be coated with various sizing materials which are brushed or rolled on to improve the surface and print performance of the sheet. Coating consists of a mix of pigments, extenders such as china clay and chalk, and binders such as starch or latex. All of these are added to give the paper a particular character or enhance print performance.

Some paper is then super-calendered and run through extremely smooth rollers a final time. Calendering paper at this point in the papermaking process determines the final smoothness or gloss of the paper.

If the paper requires an off-machine embossed finished, such as a linen finish, the paper stays in roll form and is run through an embossing machine.

The resulting paper is then cut to size depending on the type of press it will be printed on. It can be slitted and cut into rolls for web presses or cut into large folio sized sheets for offset presses. Much paper is precision trimmed into cut sized sheets for small offset and digital presses.

Coater /
Size Presses   Afterdryers   Calenders   Reel   Winder

12%   5.5%

QUALITY SENSOR

CALENDER

COATER

QUALITY SENSOR

PAPER BASICS
TYPES OF PAPER

Paper is manufactured for a broad range of uses—industrial, sanitary, newsprint and boxboard. The most common papers specified by designers for commercial printing include:
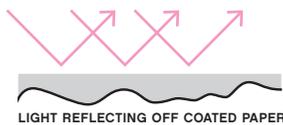
COATED

OFFSET AND OPAQUE

TEXT AND COVER

WRITING

SPECIALTY

UNCOATED PAPER

LIGHT REFLECTING OFF UNCOATED PAPER

UNCOATED INXWELL PAPER

COATED PAPER

LIGHT REFLECTING OFF COATED PAPER

PAPER BASICS
COATED

Coated papers have a coating added on their surface before calendering. Coating restricts the amount of ink that is absorbed by the paper and how the ink bleeds into the paper. This is desirable for sharp and complex images because the ink stays on top of the paper increasing the sharpness of the printed image. Coated paper is widely used for demanding imagery, digital printing, book covers, glossy photos and brochures.

Coated papers are classified by finish–Cast Coated, Gloss, Dull, Silk, or Matte— or by quality (and cost) in terms of brightness.

Coated sheets are graded Premium, number 1 through number 5 with Premium being the highest quality. These ratings are based upon brightness. Premium is defined as a brightness of above 88 and number 1 is defined as a brightness greater than 85-87.9. In the current market, higher brightness is generally preferable. A paper with a brightness of 98 is an extremely bright sheet that illuminates transparent printing inks, giving cleaner, crisper color and better black contrast.

Coatings can be applied to one side of the sheet (C1S) or both sides (C2S).

Popular finishes include:

CAST COATED
A mirror-like gloss surface

GLOSS
A shiny surface for crisp images in full-color printing

DULL/SILK
Diffused, non gloss surface for solid ink lay and readability

MATTE
Low glare surface with a toothy feel, excellent readability

PAPER BASICS
OFFSET + OPAQUE

Offset and opaque papers are uncoated with good internal bonding, high surface strength and dimensional stability. These commodity papers are generally sold in large volumes when price and availability are the most important factors. These papers print well on web presses and are usually used on long runs. These papers are frequently rated based upon their brightness and come in broad range of weights and either a smooth or vellum surface and some are engineered to run on digital presses.

Offset papers were developed to run on offset presses and are the workhorse for many printers.

Opaques are opacified papers. Their increased opacity improves brightness, formation and surface. Because of their light weight, opaque sheets can be very economical when used for direct mail—saving on mailing costs.

Uses: long print runs, direct mail, office printing, envelopes, etc.

PAPER BASICS
TEXT + COVER

Premium uncoated printing papers, commonly called text and cover papers, are available in an amazing array of colors and finishes. Text papers are lighter and used for pages in a report, booklet or brochure and cover papers are heavy and strong for covers, brochures, business cards and luxury packaging. Many text and cover lines include matching envelopes, writing weights, labels and more.

Double-thick covers are 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.

Text and cover papers are classified by finish and also by quality and cost. High-end, premium papers feature superior formation, opacity and ink holdout for excellent four-color process print reproduction on offset and digital presses.

Text and cover papers are suitable for all types of printing and specialty processes including letterpress, offset lithography, digital printing, engraving, thermography, foil stamping and screen printing. In some instances, special paper surface treatments are added to assist in ink adhesion or ink holdout. Check with your printer or paper supplier to determine the most appropriate sheet for your project.

Papers also vary in their environmental attributes. Print buyers can specify papers that have a percentage of post-consumer waste fiber and they can specify that the fiber used comes from responsibly managed forests. The Forest Stewardship Council, the Sustainable Forestry Initiative and Green Seal are some of these certifying bodies. For more information on environmentally preferable choices, please visit the websites of these organizations or visit mohawkconnects.com/environment.

Text and cover paper colors range from bright, saturated fluorescent shades to traditional, conservative navy blues and forest greens. Each manufacturer strives to offer an inviting range of shades to satisfy the need for color through and through a sheet. Interesting and economical one-color printing can be done on a colored sheet that provides the striking second color. Many available shades support brand standards and custom shades can be manufactured if the quantity needed is high enough.

Text and cover papers are characterized by the many textures that lend a tactile quality to printed material. Here are some general definitions. You can touch and feel samples in the back pocket of this booklet.

COCKLE
Cockle finish simulates handmade paper with a rough and wavy finish produced by air drying paper with only a small, controlled amount of tension. It is often found in writing or bond papers. A machine-made cockle finish is often designed to mimic the look of handmade paper.

EGGSHELL
Usually found on uncoated, uncalendered paper, eggshell is a fairly subtle but rough texture. It resembles the surface of an eggshell and may sometimes be referred to as an antique or vellum finish.

FELT
Genuine felt finishes are applied to paper by means of marking felt on the paper machine while the paper is still very wet. The felt imparts a distinctive texture by gently rearranging the fibers and creating a soft resilient surface suitable for printing and specialty print processes such as embossing, foil stamping and letterpress printing. Some felt finishes are embossed off machine.

GROOVE OR VERTICAL
The wide or narrow linear patterns are usually very pronounced and are created by an off-machine embossing process.

LAID
A linear pattern often found in high-quality writing papers and applied by a dandy roll while the paper is still very wet. The laid dandy roll consists of wires that run parallel to the roll's axis (laid lines) and chain lines which connect the laid lines and run with the grain of the paper.

LINEN
Reminiscent of woven fabric, linen is produced by embossing paper with a patterned roll as a separate off-machine operation.

SMOOTH
Measured by the Sheffield scale, smoothness is determined by how much the paper is calendered (pressed between rollers) on the paper machine. The lower the Sheffield number, the smoother the sheet.

VELLUM
This finish is a more natural, uncalendered machine finish. Some describe it as having tooth, or being toothy (a subtle roughness). It gives a unique hand to the sheet and is usually found in uncoated papers.

WOVE
Wove is a natural machine finish. It is a standard smooth even finish with no distinct pattern.

PAPER BASICS
WRITING

Writing grades, historically called bond papers, are designed for letterhead, corporate identity programs and stationery. They are made to perform equally well for a pen/pencil, offset printing, engraving and thermography, laser printing and now inkjet printing. Writing papers can be made with or without a watermark; they may also contain a percentage of cotton fiber which provides an elegant feel and added strength.

Many traditional writing papers are manufactured with cotton fibers. Cotton contributes to the feel, surface, formation and snap of bond and writing papers. Cotton fibers are long and pliable and contribute to the permanence of paper. 25% cotton is the most popular stationery sheet today.

Writing papers often contain a watermark. A watermark is an unalterable part of the paper that is created when a dandy roll presses the watermark design into the wet sheet during the papermaking process. The resulting changes in density make the watermark slightly more, or less, translucent than the rest of the sheet.

Writing papers are often made with coordinating text and cover paper lines. Commercial, monarch and window envelopes, labels and business card stocks are also manufactured to create unified office suites.

With the proliferation of desktop and digital printers, finishes have become more visual and less tactile. Popular finishes include smooth, wove and laid.

A LOCALIZED WATERMARK APPEARS IN A SPECIFIED POSITION ON THE SHEET. TRADITIONALLY, THESE ARE CENTERED.

IN A NON-LOCALIZED OR RANDOM PLACEMENT WATERMARK EACH SHEET CONTAINS A COMPLETE WATERMARK, BUT THE POSITION IS NOT CONSISTENT.

COMMERCIAL FLAP ENVELOPE

MONARCH POINTED FLAP ENVELOPE

COMMERCIAL WINDOW ENVELOPE

PAPER BASICS
SPECIALTY

The broadest category—only defined by your imagination. Their uniqueness makes them memorable but can make them tricky to specify, order and print on.

Work with your paper merchant to make sure these products can be manufactured to meet your time frame and your budget.

Inclusions of all types (fiber, glitter, confetti)

Metallic/pearlescent shimmers

100% cotton cover

Translucent papers—also in fabulous colors

Special making to match a non-standard color, weight or finish

Synthetics, or non-tree paper

Industrial papers

A specifier's guide to standard paper traits, weights and sizes.

The look, feel and color of paper can improve response rates, present a particular image, or evoke a desired emotion. When specifying paper consider the printing process you will be using, color, finish, brightness, formation, opacity, recycled content and paper weight.

With hundreds of papers to choose from many designers rely on a few favorites—usually choosing white and smooth papers. Close attention reveals a host of fine paper qualities that can make or break a job on press. The more you understand these, the better able you are to make the right paper choice.

Because paper affects the perceived quality of the finished piece, always use the best paper you can for the budget you have. In many jobs, the choice of a better paper adds considerably more to the quality of the outcome than it does to the cost.

See our handy specification check list in the inside back cover pocket.

PAPER BASICS
TRAITS

FORMATION

Formation refers to the uniformity and distribution of fibers within a sheet of paper. In well formed sheets, ink is absorbed evenly for smooth solids and clear reproduction. A poorly formed sheet will exhibit more dot gain and a mottled appearance when printed.

OPACITY

Opacity measures the amount of light passing through a sheet of paper in values from 1 (the most transparent) to 100% (the most opaque). A paper with a relatively high opacity of 96% will have less (or no) show-through from printing on the reverse side or the sheet below. Selecting a sheet with good opacity is especially important if the design includes solid blocks of color, bold type and heavy coverage. Basis weight, brightness, type of fibers, fillers, coatings and formation all influence opacity.

BRIGHTNESS

Brightness is measured as the percentage of light reflected from the surface of the paper. It is not necessarily related to color or whiteness. A blue-white and yellow white paper can have the same brightness value but look very different. A paper with a brightness of 98 is an extremely bright sheet with almost all light being reflected back to the viewer. Four-color process images pop on bright white papers, as they illuminate transparent printing inks. For pieces with a great deal of copy, a natural shade of white is preferable to minimize eyestrain.

FINISH/SMOOTHNESS

Paper comes in a wide range of finishes, with notable differences even among those classified as smooth. Finish or smoothness affects ink receptivity and ink holdout. Smoothness is measured on the Sheffield scale. A higher value on this scale typically indicates a rougher sheet—for example, coated paper may have a smoothness of 10-30, a super-smooth premium uncoated will have a smoothness of 45-60 and a vellum text and cover from 300 and higher.

SIDE-TO-SIDE CONSISTENCY

Finished paper has two sides: the wire side, which comes in contact with the wires on the paper machine and the felt side, which does not. Smoother papers have good side-to-side consistency and will print colors evenly on both the wire and felt sides.

PRINTABILITY

The print quality of a paper will be determined by formation, smoothness, brightness, opacity and if applicable, surface coating.

ENVIRONMENTAL QUALITIES

For many customers, the use of recycled paper or paper manufactured with renewable energy is important. The variety and quality of recycled papers have grown dramatically, meaning designers no longer have to compromise when choosing an environmental paper.

PAPER PERMANENCE

Acid-free papers are manufactured in an alkaline environment, which prevents the internal chemical deterioration of the paper over time. Archival papers will contain an additional 2% calcium carbonate reserve which acts as a buffer, making the paper resistant to the effects of an external acidic environment. They also contain a very small amount, if any, of lignin and meet tear criteria. The life span for alkaline paper measures in hundreds of years, compared to just decades for acid paper.
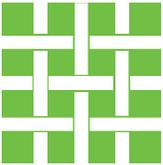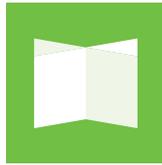
FORMATION
HOLD THE PAPER UP TO A LIGHT SOURCE. A WELL-FORMED SHEET APPEARS UNIFORM, WHILE A POORLY FORMED PAPER HAS CLUMPS OF FIBERS, GIVING IT A CLOUDY LOOK.

BRIGHTNESS
BRIGHTNESS IS OFTEN LISTED IN SWATCHBOOK CHARTS. BRIGHT WHITE SHEETS RANGE FROM 92 TO 100 WITH 100 BEING THE BRIGHTEST.

CONSISTENCY
YOU CAN SOMETIMES SEE OR FEEL INCONSISTENCIES. TO BETTER PREDICT HOW EACH SIDE WILL PRINT, ASK YOUR PRINTER TO PROVIDE AN INK DRAWDOWN ON BOTH SIDES OF THE SHEET.

ENVIRONMENT
ENVIRONMENTAL QUALITIES ARE GENERALLY INCORPORATED INTO SWATCHBOOKS AND PRINT PROMOTIONS.
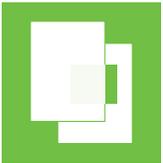
OPACITY
LAY AN UNPRINTED SHEET OF PAPER ON TOP OF A PRINTED PAGE TO SEE HOW MUCH PRINTING SHOWS THROUGH.

SMOOTHNESS
ASK ABOUT THE PAPER'S SHEFFIELD VALUE.

PRINTABILITY
REQUEST SAMPLES THAT DEMONSTRATE HOW A PAPER PRINTS BEFORE SPECIFYING IT. YOUR PAPER MERCHANT SALES REP OR PRINTER CAN PROVIDE REAL-WORLD PROJECTS PRINTED ON THE PAPER, IN ADDITION TO MILL PROMOTIONS.

PERMANENCE
PAPER COMPANY'S ANSI CERTIFICATION FOR ACID-FREE AND/OR ARCHIVAL PAPER. ACID-FREE INFORMATION IS OFTEN INCORPORATED IN SWATCHBOOK COPY AND CHARTS.

PAPER BASICS
WEIGHTS

The paper business uses some unique measurements for standard weights. Here are some of the most common terms.

CALIPER
Caliper indicates the paper's thickness. Measured in thousandths of an inch, the caliper can either be expressed as .007 inches, or 7 point. A paper's caliper is affected by its basis weight and finish.

M WEIGHT
M weight is the term used for the weight of 1,000 sheets of the given size.

BASIS WEIGHT
The American concept of basis weight is the basis for much confusion. Each different paper category has a specific basic size associated with it. The weight of 500 sheets in its basic size is a paper's basis weight. This system provides a standard of comparison that doesn't change with the size of sheet or quality of stock you are buying. However, you must always be mindful of the paper category as well as the pounds.

GSM
The metric system measures paper weight in grams per square meter (g/m2 or GSM). The scale is continuous, meaning that all categories of paper use the same scale. This avoids the confusion of the American system and promotes a good sense of relative weights. Many swatchbooks provide gsm equivalents.

STANDARD BASIC SIZES

Writing	17 x 22	For stationery, bonds and legal documents
Text	25 x 38	Popular for text pages in books or booklets
Cover	20 x 26	For covers of booklets or pocket folders

PAPER BASICS
COMPARATIVE WEIGHTS

American paper manufacturers make paper to a weight standard, called the basis weight. Basis weight is determined by weighing 500 sheets of any grade of paper in the proper basic size.

COMPARATIVE BASIS WEIGHTS
The weight of 500 sheets (one ream) of a standard basic size.

Writing 17 X 22	Text 25 X 38	Cover 20 X 26	GSM
20	50	—	75
24	60	—	90
27	68	—	100
28	70	—	105
—	78	—	115
32	80	—	120
36	91	50	135
40	100	55	150
—	110	60	162
—	119	65	175
—	122	67	180
—	146	80	215
—	—	92	250
—	182	100	270
—	—	120	324
—	—	130	350
—	—	160	432
—	—	180	486

PAPER BASICS
SIZES

Each size in the A range is half the area of the preceding size (the squared dimensions), but the proportions remain the same. This facilitates the enlargement or reduction of illustrations and text within the range of sizes. The A4 size normally is used for trade literature, government publications, journals, specifications, bills of lading, letterheads and contracts.

U.S. STANDARDS

	MM	INCHES
	889 x 1575	35 x 45
	584 x 889	23 x 35
	432 x 559	17 x 22
LEDGER	279 x 432	11 x 17
LEGAL	216 x 356	8.5 x 14
LETTER	216 x 279	8.5 x 11
MONARCH	184 x 267	7.25 x 10.5
EXECUTIVE	140 x 216	5.5 x 8.5
	108 x 140	4.25 x 5.5
	89 x 108	3.5 x 4.25

INTERNATIONAL STANDARDS

	MM	INCHES
A0	841 x 1189	33.1 x 46.8
A1	594 x 841	23.4 x 33.1
A2	420 x 594	16.5 x 23.4
A3	297 x 420	11.7 x 16.5
A4	210 x 297	8.3 x 11.7
A5	148 x 210	5.8 x 8.3
A6	105 x 148	4.1 x 5.8
A7	74 x 105	2.9 x 4.1

PAPER BASICS
SWATCHBOOKS

Swatchbooks are a road map to a paper grade. Full of product availability, standard sizes, production tips, suggested uses and paper samples. There is usually a sampling, or waterfall, of each finish, color and weight available. The samples are accompanied by charts that show what precise combinations are available. (Note, not all weights and sizes are available in all colors and finishes.) Furthermore, swatchbooks function as a resource for product specific information about digital printing, environmental attributes, availability of coordinating envelopes and labels and detailed production specifications.

READING CHARTS

In addition to grade name, color and finish options charts outline sheet sizes and available weights. They also incorporate other useful information such as press compatibility, environmental certifications, postconsumer waste content, brightness, packing information or item stocking numbers.

COLORS

Color	Finish	Content	70T / 104 gsm	(70T / 104 gsm)	80C / 216 gsm	100C / 270 gsm	120DTC / 324 gsm	160DTC / 432 gsm
Stellar White	Carnival	Virgin Pulp			●	●		
White	Carnival	30% PCW	●	●	●	●		●
Beet	Carnival	30% PCW				●		
Forest Green	Carnival	30% PCW			●			
Deep Blue	Carnival	30% PCW			●			
Deep Blue / Stellar White Duplex	Carnival	15% PCW					●	
New Black	Carnival	30% PCW			●			

SPECS

	70T / 104 gsm	70T / 104 gsm	80C / 216 gsm	100C / 270 gsm	120DTC / 324 gsm	160DTC / 432 gsm
Weights / gsm	70T / 104 gsm		80C / 216 gsm	100C / 270 gsm	120DTC / 324 gsm	160DTC / 432 gsm
Size: Inches / mm	23x35 / 584x889	25x38 / 635x965	26x40 / 660x1016	26x40 / 660x1016	26x40 / 660x1016	26x40 / 660x1016
Caliper	6.1		11.5	14.2	17.6	22.5
M Weight	119	140	320	400	480	640
Sheets per Carton	1200	1000	400	250	250	250

PAPER BASICS
DISTRIBUTION

Specifying begins with your local paper merchant. Printers purchase paper from a paper merchant, which is a distribution company that contracts with various paper manufacturers. Paper manufacturers and merchants are represented by sales people who work with printers, designers, ad agencies and corporate buyers. Your local merchant is a great resource for information about a paper's printability, consistency and performance. They can show you printing samples on competitive papers that demonstrate various techniques, make paper dummies of different weights and finishes and offer cost alternatives.

When you make your specification, remember that your printer will purchase the paper directly. Make sure they know who you worked with—both the paper merchant and the sales person.

Many paper merchants operate their own retail stores, selling a wide range of papers including reams of copy paper and envelopes along with high quality digital and offset printing papers. These merchant paper stores offer a larger selection of high quality papers than office superstores.

Paper is also sold directly to end-users through catalogs. Office environments of all sizes may purchase papers for proposals, letters, memos, newsletters, etc. which are typically run on laser or inkjet printers and copiers. Popular catalogs include United Stationers, WB Mason, SP Richards and Office Depot.

Paper and envelopes are also sold directly to end-users, by the manufacturer, such as at mohawkconnects.com. Other online companies include thepapermillstore.com, paper.com and amazon.com.

See the insert in the back pocket for a specification guide and specification check list.

PAPER MILL → MERCHANT → PRINTER → DESIGNER → END USER

PAPER DISTRIBUTION AND
SALES CHAIN
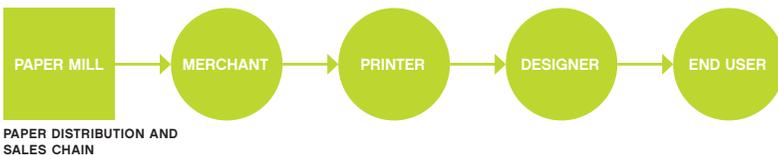
GLOSSARY OF PAPER TERMS

ACID FREE
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.

ARCHIVAL
Archival papers do not deteriorate (become brittle) over time and are acid-free.

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 weigh 24 pounds. The standard basic size for writing papers is 17 x 22, text is 25 x 38, cover is 20 x 26.

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 scale.

BOOK
General term for papers suitable for the graphic arts. Book paper may be coated or uncoated and is equivalent in weight to text papers.

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 better black contrast.

CALENDER
A machine which smooths paper by pressing it between rotating cylinders.

CALIPER
Caliper is a measure of paper thickness expressed in thousandths of an inch. The micrometer is used to measure caliper. A paper's caliper determines the bulk of a given basis weight and is affected by processing done to obtain smoothness and porosity.

CARBON NEUTRAL
To be carbon neutral an entity must have its carbon emissions calculated, reduced where possible and offset through the purchase of real, verified and additional carbon offset credits.

CAST COATED
High-gloss coated paper manufactured by casting the coated paper against a highly polished, heated steel drum.

COATED PAPER
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.

CONDUCTIVITY
The electrical property of a sheet of paper that enables it to attract charged toner. Low conductivity can result in poor image quality in digital systems.

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

CUT SIZE
Papers cut to a small common size, usually 8.5 x 11 (letter size) and 17 x 11.

DECKLE EDGE
The rough edges on hand-made and machine-made papers. These edges were originally considered an imperfection but came into fashion with the handcraft revival in the last decade of the 19th century.

DIGITAL IMAGING SURFACE™
Mohawk's trademarked unique surface treatment for both uncoated and coated papers, specifically engineered to enhance paper-toner performance and yield increased print fidelity.

DIGITAL PAPERS
Papers designed for the specific demands and imaging techniques of digital presses. This includes dry toner, liquid toner and ink jet presses. They are available in popular digital sheet sizes and rolls.

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.

DUMMY
A non printed version of a planned printed piece made from the correct paper grade, size, folds and binding.

DUPLEX PAPER
Text- or cover-weight papers produced by laminating together two pieces of equal weight paper. Often duplex paper is made with a sheet of white paper laminated to a sheet of dark colored paper.

DUPLEXING
The ability of a press or printer to print on both sides of a page without having to manually turn the sheet over.

EMBOSSED PAPER
Embossing takes place off the paper machine as a separate operation. The embosser uses a patterned roll and pressure to produce an embossed (raised) pattern on a web of paper. Embossing produces a very compact sheet with excellent ink holdout. Linen paper is the most common embossed pattern.

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.

FORMATION
Refers to the uniformity and distribution of fibers within a sheet of paper. In a well formed sheet, solid ink coverage will lay down smoothly. A poorly formed sheet will exhibit a mottled appearance when printed. Formation can be checked by holding the paper up to a light source: a well formed sheet appears uniform, while in a poorly formed sheet the fibers appear as clumps, giving it a cloudy look.

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.

GSM
The metric system measures paper weight in grams per square meter (g/m2 or GSM).

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.

HOUSE SHEET
Paper that is kept in stock by a printer so it is readily available. It is generally something that can be used for a wide variety of printing jobs.

I-TONE®

Mohawk's proprietary Digital with i-Tone surface has a unique affinity for both liquid and dry toners, offering breakthrough performance on HP Indigo presses and color digital production presses using dry toner. Mohawk's i-Tone papers have exceptional transfer, adhesion and image durability on smooth and textured papers.

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, more vibrant printed images.

INXWELL®

A revolutionary and exclusive technology, created and patented by Mohawk, that produces text and cover papers with an uncoated feel, but with the added advantages of superior ink holdout, lower dot gain and significantly increased opacity.

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 consists 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. If your job is designed to run through a laser printer, you should specify laser-compatible offset inks.

LINEN FINISH

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

MACHINE FELT FINISH

Rubber marking rolls apply a felt-type finish to paper right before the dryer section. This technique yields a softer surface than embossing and better bulk. The surface is slightly harder than with a genuine felt finish. Though less natural in feel, a machine-felt texture is more economical and provides greater ink holdout because of its compact surface.

MOISTURE

Paper is made to contain between 4% and 7% moisture. Paper will either pick up or lose moisture to reach equilibrium with the relative humidity in which it is used. 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.

M-WEIGHT

The weight, in pounds, of 1000 sheets of paper of a given size.

NON-INTEGRATED MILL

A paper mill that does not have an on-site pulp mill and must purchase all the pulp it requires.

OFFSET PAPER

Uncoated paper designed for use in offset lithography. Important properties include good internal bonding, high surface strength, dimensional stability, lack of curl and freedom from foreign surface material.

OPACITY

Measure of the percentage of light passing 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.

PAGES PER INCH (PPI)

The number of pages in a one inch stack of paper.

PAPER AND ENVELOPE CONVERTER

A company that constructs various envelopes and other end-use products from parent-size rolls or sheets of paper.

PAPER GRADE
A system used to classify papers by their common features or content, such as recycled, coated or newsprint papers.

PAPER MANUFACTURER
A company that makes web, sheet and/or cut size paper and sells it through paper merchants and paper stores.

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.

PAPER STORES
A retail outlet often run by a paper distributor, which sells paper in cut sizes to end users. Paper stores typically offer a larger assortment of premium printing papers and envelopes than office superstores, which tend to emphasize papers for xerography.

PCF
Process chlorine free (PCF) refers to papers that contain postconsumer recycled fiber that was 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. Because PCF paper contains recycled-content fibers, PCF paper production can also reduce water, energy and virgin fiber usage.

POROSITY
Often interchanged with air permeability, porosity is a characteristic of a paper's internal structure. Porosity is the ratio of pore volume to total volume of a sheet. Although rarely measured for premium papers, porosity can indicate how ink will penetrate the sheet.

POSTCONSUMER WASTE FIBER (PCW)
Fiber recovered for papermaking from postconsumer waste paper, which has served its intended use and has been discarded for disposal after passing through the hands of a final user.

RECYCLED
Papers that contain postconsumer waste fiber can currently be called recycled. The Federal Executive Order calls for a 30% postconsumer waste fiber minimum for uncoated papers and a 10% postconsumer waste fiber minimum for coated papers.

SHEFFIELD
The method used to measure the smoothness of paper. The lower the number, the smoother the paper.

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. For example, Navajo's smoothness is 45, whereas vellum offset may have a rating of 300+.

STRENGTH
Paper strength is determined more by the nature of its fiber than its thickness. High bursting strength is achieved by forming paper with a tight weave of long fibers so that they are both vertical and horizontal within the paper.

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.

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

VELLUM FINISH
Natural or machine finish, like wove or eggshell.

WATERMARK
A watermark is an unalterable part of the paper that is created when a dandy roll presses the watermark design into the wet sheet during the papermaking process. The resulting changes in density make the watermark slightly more, or less, translucent than the rest of the sheet.

WIND ENERGY
Electric energy that is produced by wind driven turbines. Also called windpower.

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 and corporate identity programs.

H.O.T. Graphic Services