Paper Basics

Paper Basics
A guide to specifying the perfect paper

01: Plan to Make It

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.

The Pursuit of a Quality

The way paper feels on your fingertips 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.

More great information may be found at www.mohawkpaper.com

Papermaking at Mohawk

Papermaking at Mohawk began near the end of the Civil War when the Frank Gilbert Paper Company, a small newsprint mill, began operating where the Mohawk and Hudson Rivers meet. The company was purchased in 1931 by George O'Connor and remains privately owned.

Over the years, Mohawk has blended traditional craftsmanship with state-of-the-art papermaking technology and a view toward the future. With ongoing capital investment, a corporate culture focused on rapidly evolving customer needs, and a commitment to the environment, Mohawk is the most technologically advanced papermaker in its field.

02: What It Takes

The fourdrinier machine, invented near the dawn of the 19th century, remains the basis of modern continuous papermaking.

Mohawk is a non-integrated mill, which means that we do not manufacture our own pulp. When we buy pulp, it has already been purified and formed into thick sheets. We buy a variety of hardwood and softwood pulps and postconsumer waste fiber, because each of our papers requires its own special mix of fiber.

Common Ingredients of Paper:

Pulp, Cotton, Postconsumer waste fiber, Broke (mill waste fiber), Calcium Carbonate, Dyes and Colorings, Optical Brighteners, Fillers, Sizing, Coating.

03: The Right Grade

The first phase of paper choice is determining the basic type of paper you need, based on the intended audience for the piece, the design, the way you intend to print it and the budget. These are the categories:

Opaques and Offset papers

These commodity papers are generally sold in large volumes when price and availability are the most important factors. These papers are uncoated with good internal bonding, high surface strength, and dimensional stability. These are workhorse papers that print well on web presses and are usually used on long runs.

Coated Papers

Coated papers are made like offset papers but have a coating added on their surface before calendering. The coating creates a sheen on the paper and provides greater ink holdout to minimize dot gain. Coated papers are classified by finish–Cast Coated, Gloss, Dull, Silk, or Matte—or by quality (and cost) in terms of brightness. Manufacturers assign coated papers a number from 1 to 5, with 1 being the highest quality.

Writing Papers (a.k.a. Correspondence Papers or Bond Papers)

Writing grades, historically called Bond papers, are designed for letterhead, corporate identity programs, and office printers. 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. Writing papers are often made with coordinating Text and Cover papers.
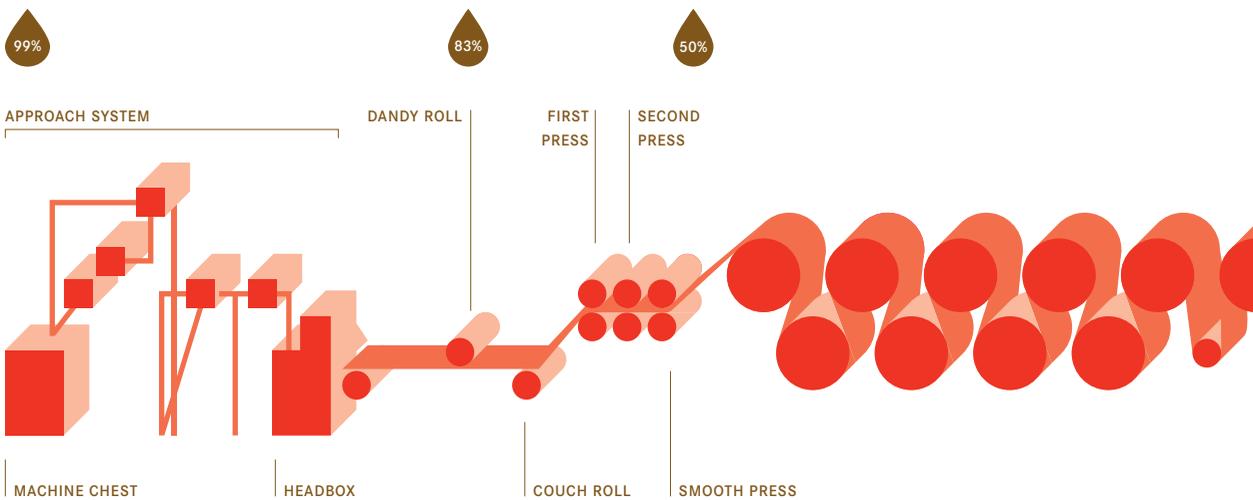
Text and Cover papers

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 and business cards.

Text and Cover papers are classified by finish and also by quality and cost. Text and Cover papers are made with a smooth finish, a natural finish (called vellum, wove or eggshell), or a textured finish (felt, linen and many more).

Fourdrinier   Presses   Main Dryer Section

99%

83%

50%

APPROACH SYSTEM   DANDY ROLL   FIRST PRESS   SECOND PRESS

MACHINE CHEST   HEADBOX   COUCH ROLL   SMOOTH PRESS

When the paper mixture hits the Fourdrinier machine, it is 99% water. When paper is finished, it contains 5% water.

High-end, premium papers feature better formation, opacity and ink holdout for better print results. Mohawk offers a range of price points within the premium paper category.
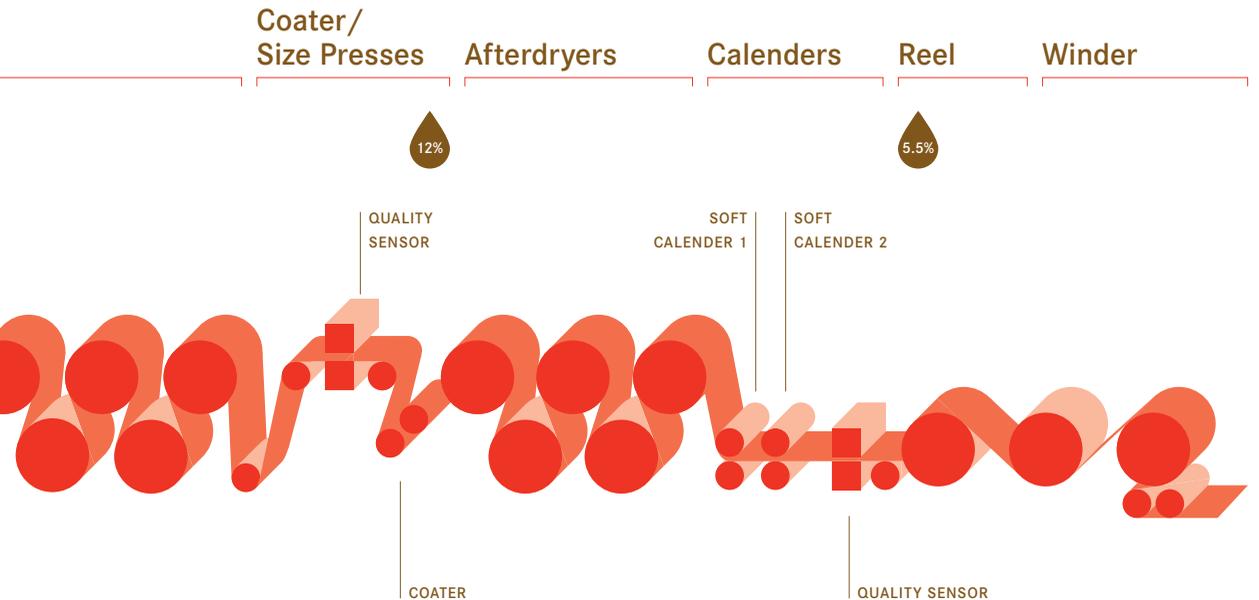
Inxwell® Papers

Mohawk's proprietary Inxwell papers bridge the gap between uncoated and coated paper. Inxwell technology produces Text and Cover papers with the classic uncoated feel, but with the added advantages of superior ink holdout, lower dot gain, and significantly increased opacity.

See the differences in the cross-section surface profiles of three different types of paper. Smoother surfaces mean better ink holdout and less dot gain.

An uncoated sheet

An uncoated Inxwell sheet

A coated sheet
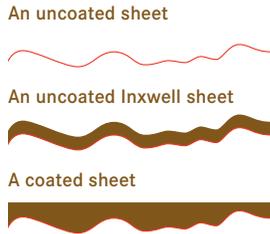
Digital Papers

Digital papers, available as coated or uncoated, are optimized for performance in digital printers and presses, most of which use toner-based technology. Manufacturers engineer these papers with a lower moisture content, cut them to size for the digital printers and presses, and may apply a surface treatment to improve toner transfer and adhesion. Digital papers are primarily bright white and smooth, although new technologies such as Mohawk's i-Tone provide successful toner adhesion in the "valleys" of textured paper.

Coater/
Size Presses   Afterdryers   Calenders   Reel   Winder

12%

5.5%

QUALITY
SENSOR

SOFT
CALENDER 1

SOFT
CALENDER 2

COATER

QUALITY SENSOR

Finer Points

With hundreds of text and cover papers, 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.
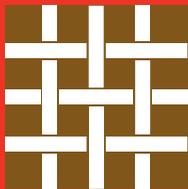
Formation

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.

HOW TO CHECK: 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. Compare a sheet of standard copy paper with a sheet of Mohawk Superfine to see the difference.
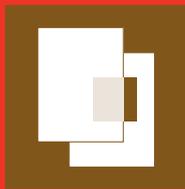
Opacity

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.

HOW TO CHECK: Lay an unprinted sheet of paper on top of a printed page to see how much printing shows through and/or examine a printed sample on the exact paper you are considering.

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.

HOW TO CHECK: Brightness is often listed in swatchbook charts. Bright white sheets range from 92 to 100.

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.

HOW TO CHECK: Ask about the paper's Sheffield value. A higher value on this smoothness 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 200-250.
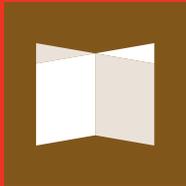
Side-to-Side Consistency

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

HOW TO CHECK: You can usually see and feel inconsistencies such as on a Laid finish paper. To better predict how each side will print, ask your printer to provide an ink drawdown on both sides of the sheet.

Printability

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

HOW TO CHECK: 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.

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.

MOHAWK FINE PAPERS has been a leader in reducing the environmental impact of paper making and paper usage. It was the first paper company to use emission-free renewable windpower. It has continuously raised the standards for recycled paper and realigned its production processes to earn accreditation from various environmental organizations.

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.

HOW TO CHECK: Ask about the paper company's ANSI certification for acid-free and/or archival paper. Acid-free information is often incorporated in swatchbook copy and charts.

Basis 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.

PAPER GRADE	BASIC SIZE	ABBREVIATIONS	NOTES
Writing and Bond	17" x 22"	W (Writing), Laser, lb.	Originally applied to cotton-content paper for printing stationery, bonds and legal documents.
Text	25" x 38"	T	Popular weights used for text pages in books or booklets.
Cover	20" x 26"	C	Heavier papers used for covers of books or booklets or stand alone pieces such as pocket folders.
Bristol	22.5" x 28.5"		Made by pasting or laminating two text weights together to form a stiff cover sheet. Named for Bristol, England, where paper was first made.
Double Thick, and Cover Bristol	20" x 26"	DTC and CB, respectively	Made by pasting or laminating two papers, either text or cover, to form a very thick, stiff sheet.

04: Weights and Measures

Weights and Measures
The paper business uses some unique measurements for standard weights and sizes. 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. Many swatchbooks and stocking charts show gsm equivalents to pounds.

GSM
The metric system measures paper weight in grams per square meter (g/m^2 or GSM).

The scale is continous, 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.

Please visit www.mohawkpaper.com for our PaperMath calculator to translate inches to millimeters, sheets to pounds, and more.

Comparative Basis Weights

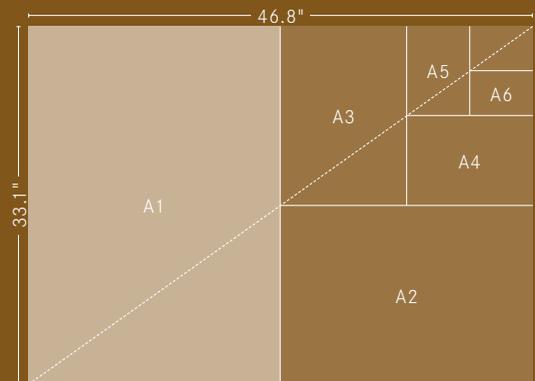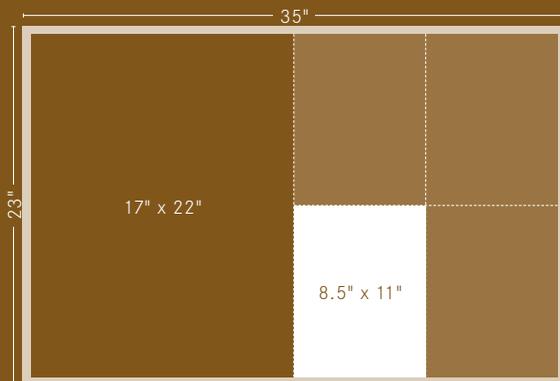| Writing/Bond	Text	Cover	GSM
	50		74
20			75
	60		89
24	60.8		90
26.6	67.5		100
	70		104
28	70.9		105
	77.7		115
	80		118
32	81.1		120
36	91.2	50	135
	100	54.7	148
40	101.3	55.5	150
	110	60	162
		64.7	175
	118.75	65	176
	121.6	66.5	180
		79.5	215
	146.2	80	216
		88	238
		90	243
		92.4	250
	182.7	100	270
		110	297
		120	324
		129.4	350
		130	352
		160	432
		180	486

Sized Up

In Europe and Asia, paper sizes follow the metric standard and are referred to as ISO or JIS "A" series. One advantage in using this sizing is that each size in the "A" range is half the area of the preceding size (the squared dimensions), but the proportions remain the same (see diagrams below).

U.S. Standard

DESIGNATION	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		8.5 x 14
Letter	216 x 279	8.5 x 11
Monarch		7.25 x 10.5
Executive	140 x 216	5.5 x 8.5
Statement	108 x 140	4.25 x 5.5
	89 x 108	3.5 x 4.25

ISO and JIS A: Series

| DESIGNATION	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

05: Envelope Basics

Mohawk papers are stocked by National Envelope and Leader Paper Products. Contact your printer or local merchant to ensure your needs can also meet your schedule. For larger orders, envelopes can be made with any paper, in any size and style. These orders can take between two and four weeks for delivery.

SEAM STYLES

Side

Diagonal
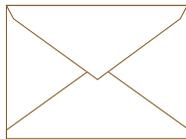
Center

FLAP STYLES

Pointed

Square

Wallet

Commercial

Mailpoint

MARKS OF DISTINCTION

Watermarks are a symbol of excellence and distinction. 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 thick and thin areas make the watermark slightly more translucent than the rest of the sheet. Well-recognized brand names like Strathmore on the watermark are a sign of quality.

Private Watermarks
A private watermark is your custom design embedded into the paper during the early stage of the papermaking process when a dandy roll presses your mark design into the wet paper web. Your unique mark becomes a permanent part of the paper, adding security and personality.

DigitalMark
DigitalMark, a proprietary process from Mohawk, offers a beautiful, simple, affordable, fast-turnaround alternative to traditional watermarking. Digital technology makes it possible to embed your mark or logo in several of our Strathmore Writing and Script papers.

Localized Watermarks
A localized mark will always appear within one-half inch of the specified position on the sheet. Traditionally, these marks are optically centered.

Non-localized Watermarks
In a non-localized or random placement, each sheet will contain a complete watermark, but the position will not be consistent. In some sheets the mark may even be cut: split in half, top-to-bottom or side-to-side.

1 Commercial / Office

For a variety of business and personal correspondence, i.e., letterheads, invoices, statements, writing stationery and direct marketing mailings.

ENVELOPE	SIZE	ENCLOSURE
6 1/4	3.5 x 6	3.25 x 5.75
6 3/4	3.625 x 6.5	3.5 x 6.25
8 5/8	3.625 x 8.625	3.5 x 8.375
7	3.75 x 6.75	3.5 x 6.5
Monarch (7 3/4)	3.875 x 7.5	3.75 x 7.25
9	3.875 x 8.875	3.75 x 8.625
10	4.125 x 9.5	4 x 9.25
DL	4.313 x 8.625	4.125 x 8.375
11	4.5 x 10.375	4.25 x 10.125
12	4.75 x 11	4.5 x 10.75
14	5 x 11.5	4.75 x 11.25

2 Baronial

With a pointed flap, for formal business announcements, invitations and changes of address.

ENVELOPE	SIZE	ENCLOSURE
Gladstone	3.563 x 5.562	3.375 x 5.375
4 Baronial	3.625 x 5.125	3.5 x 4.875
Astor	3.625 x 5.625	3.5 x 5.375
21	4 x 5.937	3.875 x 5.75
5 Baronial	4.125 x 5.5	4 x 5.25
53	4.125 x 6.25	4 x 6
5 1/2 Baronial	4.375 x 5.75	4.25 x 5.5
6 Baronial	4.75 x 6.5	4.625 x 6.25
110	5 x 7.25	4.75 x 7
Lee	5.25 x 7.25	5.125 x 7
137	5.5 x 8.5	5.25 x 8.25

3 Side Seam

Modern styling for a variety of business and correspondence, i.e., letterheads, invoices, statements, writing stationery, and direct marketing mailings. Offers a larger printing area uninterrupted by seams.

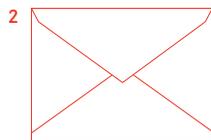| ENVELOPE	SIZE	ENCLOSURE
6 3/4	3.625 x 6.5	3.5 x 6.25
7 3/4	3.875 x 7.5	3.75 x 7.25
9	3.875 x 8.875	3.75 x 8.625
10	4.125 x 9.5	4 x 9.25

4 Announcement (also called A-style)

For invitations, notecards, small booklets and promotional pieces and, more recently, for distinctive business stationery. This style envelope is enhanced by the use of text paper.

ENVELOPE	SIZE	ENCLOSURE
A-2	4.375 x 5.75	4.25 x 5.5
A-6	4.75 x 6.5	4.625 x 6.25
A-7	5.25 x 7.25	5.125 x 7
A-8	5.5 x 8.125	5.375 x 7.875
A-Long	3.875 x 8.875	3.75 x 8.625
A-10	6 x 9.5	5.875 x 9.25

5 Square Flap

Contemporary flap style that adds a touch of elegance to any business correspondence. Particularly popular as part of an executive stationery suite.

ENVELOPE	SIZE	ENCLOSURE
6 3/4	3.625 x 6.5	3.5 x 6.25
7 3/4	3.875 x 7.5	3.75 x 7.25
9	3.875 x 8.875	3.75 x 8.625
10	4.125 x 9.5	4 x 9.25
DL	4.313 x 8.625	4.125 x 8.375

6 Booklet

For annual reports, brochures, sales literature, and a variety of printed material. Can be used in volume mailings processed by inserting and sealing equipment.

| ENVELOPE	SIZE	ENCLOSURE
3	4.75 x 6.5	4.5 x 6
4 1/2	5.5 x 7.5	5.25 x 7
5	5.5 x 8.125	5.25 x 7.625
6	5.75 x 8.875	5.5 x 8.375
6 1/2	6 x 9	5.75 x 8.5
6 5/8	6 x 9.5	5.75 x 9
6 3/4	6.5 x 9.5	6.25 x 9
7 1/4	7 x 10	6.75 x 9.5
7 1/2	7.5 x 10.5	7.25 x 10
9	8.75 x 11.5	8.5 x 11
9 1/2	9 x 12	8.75 x 11.5
10	9.5 x 12.625	9.25 x 12.125
13	10 x 13	9.75 x 12.5

7 Square

Square flap and side seam construction allows for printing uninterrupted by seams. Good choice for announcements, booklets, promotions, etc.

ENVELOPE	SIZE	ENCLOSURE
5	5 x 5	4.75 x 4.75
5 1/2	5.5 x 5.5	5.25 x 5.25
6	6 x 6	5.75 x 5.75
6 1/2	6.5 x 6.5	6.25 x 6.25
7	7 x 7	6.75 x 6.75
7 1/2	7.5 x 7.5	7.25 x 7.25
8	8 x 8	7.75 x 7.75
8 1/2	8.5 x 8.5	8.25 x 8.25
9	9 x 9	8.75 x 8.75
9 1/2	9.5 x 9.5	9.25 x 9.25
10	10 x 10	9.75 x 9.75
13 1/2	13.5 x 13.5	3.25 x 13.25

8 Catalog

For catalogs, large booklets, and other heavy enclosures usually inserted by hand.

ENVELOPE	SIZE	ENCLOSURE
Glove		
7	4 x 6.375	3.75 x 5.875
8	3.875 x 7.5	3.625 x 7
Scarf		
1	4.625 x 6.75	4.375 x 6.25
3	5 x 7.5	4.75 x 7
4 1/2	5.5 x 7.5	5.25 x 7
6	5.5 x 8.25	5.25 x 7.75
Catalog		
1	6 x 9	5.75 x 8.5
1 3/4	6.5 x 9.5	6.25 x 9
3	7 x 10	6.75 x 9.5
6	7.5 x 10.5	7.25 x 10
8	8.25 x 11.25	8 x 10.75
9 3/4	8.75 x 11.25	8.5 x 10.75
10 1/2	9 x 12	8.75 x 11.5
12 1/2	9.5 x 12.5	9.25 x 12
13 1/2	10 x 13	9.75 x 12.5
14 1/2	11.5 x 14.5	11.25 x 14
15	10 x 15	9.75 x 14.5
15 1/2	12 x 15.5	11.75 x 15
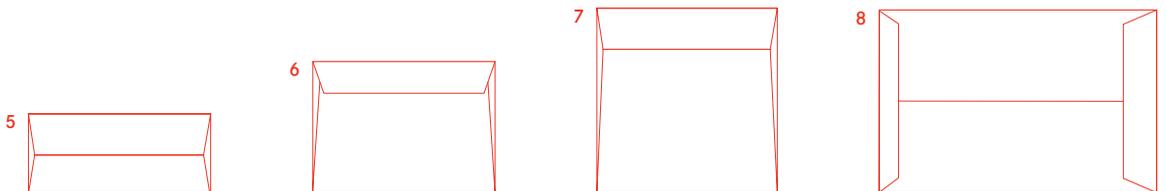
Paper transactions can be direct or negotiated, depending on the size of the job.

Big Jobs

For large projects, designers are responsible for selecting the paper to be used, which in turn is purchased by the commercial printer. Printers purchase paper from a paper merchant, which is typically a distribution company that contracts with various paper manufacturers.

Paper manufacturers and merchants are represented by sales people who work with printers, and specification sales people who work with 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. Please refer to Mohawk's list of distributors at www.mohawkpaper.com to find a local merchant.

Small Jobs

Many paper merchants operate their own retail stores, selling reams of copy paper along with high quality digital and offset printing papers to end-users and quick printers. These merchant paper stores offer a larger selection of high quality papers than office superstores. Please refer to Mohawk's list of distributors at www.mohawkpaper.com to find a local paper store.

Catalogs

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.

Online sales

Paper and envelopes are sold directly to end-users through online companies such as www.thepapermillstore.com and www.paper.com.

THE DESIGNER'S PROCESS

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.

Step One
Start with a swatchbook. Then choose a stock, finish, and color.

Step Two
Choose a basis weight. Check the swatchbook chart to be sure the combination of finish, color and weight you want is available.

Step Three
Ask your merchant rep for printed samples, plain paper samples and/or a paper dummy of the chosen paper.

Step Four
Your printer will decide on sheet size and grain direction as part of the estimating process.

Step Five
Your printer may then call several merchants to receive competitive pricing. Make sure the printer knows which merchant rep has supported you with samples and dummies.

Step Six
The printer generally includes paper costs in the final estimate. Paper costs generally represent 35% of the total printing bill.
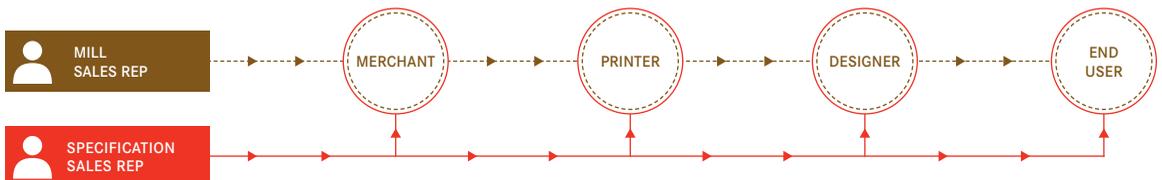
Step Seven
The selected merchant orders the paper from the manufacturer and then sells it to the printer.

THE PAPER CHAIN

MILL SALES REP → MERCHANT → PRINTER → DESIGNER → END USER

SPECIFICATION SALES REP → MERCHANT → PRINTER → DESIGNER → END USER

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. All papers made by Mohawk are acid free.

ARCHIVAL
Archival papers do not deteriorate (yellow and become brittle) over time. Archival papers are acid-free. They contain calcium carbonate or other buffers for our acidic environment; they contain a very small amount, if any, lignin; and they meet tear criteria.

BASIS WEIGHT
Weighing 500 sheets of any grade of paper in its standard basic size will determine its basis weight. In other words, 500 sheets of 17" x 22" 24-pound Bond will weigh 24 pounds. The standard basic size for writing papers is 17" x 22", text is 25" x 38", 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 (like Mohawk Navajo) 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.

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
Going carbon neutral is a way of taking responsibility for greenhouse gas emissions. Through a rigorous program, Mohawk has first reduced emissions and then purchased carbon offsets for the remaining emissions on select papers. These carbon offsets, in the form of RECs and VERs, financially support emission-free, renewable energy projects. The result is paper made entirely with renewable energy, while striving to reach net zero carbon emissions.

CARD STOCK
See Cover Paper.

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 processes of the emerging digital printing technologies. They are available in popular digital sheet sizes and small 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.

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.

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.

I-TONE®

Mohawk's proprietary 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 printed images.

INXWELL®

A revolutionary and exclusive technology, created and patented by Mohawk Fine Papers, that produces text and cover papers with the classic uncoated feel, but with the added advantages of superior ink holdout, lower dot gain, and significantly increased opacity. Mohawk Options and Navajo are Inxwell papers, and are ideal for both offset and digital printing.

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.

PAPER AND ENVELOPE CONVERTER
A company that constructs various envelopes and other end-use products from parent-size 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 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 (Sheffield rating?) is 45, whereas vellum offset may have a rating from 200–250.

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.

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.

08: Things to Consider

The right paper choice for your job depends on how you answer these questions:

What is the intended use for the final piece and how long does it need to last?

Is the perception of quality important to the intended audience for the piece?

What kind of printing process will you use? (Your printer should be involved in your paper decision early on.)

Which finish will best create the effect you want to achieve?

What kind of images are you printing, and how important is contrast? (The more important the contrast, the whiter the paper you need.)

Do you need envelopes? Call your merchant for availablity.

How much of a concern is text show-through? (This answer affects the opacity you need.)

Are mailing costs a concern? (This answer may affect the basis weight you choose. Weigh a paper dummy and add a bit more for ink to compare the mailing weight.)

Does your client want to send an environmental message? (This answer may send you in the direction of recycled paper, FSC-certified paper or Green-e paper made with wind-generated electricity.)

What's the deadline? (Paper availability can also affect your choice.)

What's the budget? (Paper can account for up to 35 percent of total printing costs. Make sure you know how much you have to work with.)