FIBRE CHOICES

The fibre choice used for making commercial printing papers must meet certain specifications, therefore not all fibres are suitable. Our best fibre sources come from trees that are harvested from a well-managed forest or tree farm, post-consumer fibre, cotton or sugar cane. Each fibre has its own unique properties which determine paper quality. Most paper today is made from a combination of hardwood and softwood fibre.

Softwood

Coniferous trees such as Spruce, Fir, Hemlock and Western Red Cedar are major sources of fibre in paper manufacturing today. Softwood fibre tends to be longer than hardwood fibre and is less expensive to produce, since softwood trees reach maturity much faster than hardwood trees. Softwood pulp imparts strength and opacity.

Hardwood

Hardwood fibre is obtained from deciduous trees such as Oak, Maple and Hickory, all of which lose their leaves every year. This finer, more delicate fibre gives the paper uniformity and smoothness. Hardwood fibre is usually combined with softwood fibre in papermaking.

Cotton

Mills buy cotton trimmings from textile manufacturers. They also buy linters‐the short hairlike fibres that remain on cottonseeds after the longer cotton fibre, suitable for making fabric, has been removed. The linters are bleached, cleaned and pressed into sheets and sold to paper mills. Cotton fibre is longer than wood fibre and is flat and twisted, producing high-quality, fine writing paper.

Grass/Agricultural

Fibres from several sources are classified as “grass fibres”. Examples are kenaf, an agricultural crop from India, bagasse, the waste fibre from sugarcane, hemp and wheat straw.

Post Consumer

Waste paper is collected from the waste stream before reaching landfill and converted into reusable form. If the waste paper has been printed, the ink is removed by de-inking which involves several processes such as floatation, washing, screening and dispersion.

PULPING

The first step in papermaking is the production of pulp. Wood fibre is the most widely used raw material. Wood fibre comes from softwood trees such as Spruce, Pine, Fir, Larch and Hemlock and hardwoods such as Eucalyptus, Apen and Birch. It is sourced from forests and tree farms as well as offcuts and waste from the lumber industry. There are three types of pulping processes:

Mechanical

This method of pulping is accomplished by grinding trees against an abrasive surface. Pulp is by nature a grey colour and has contaminants and impurities such as lignin. Lignin is a gluelike substance that bonds wood fibres together in a tree, and turns newspapers yellow and brittle over time. Pulp produced using this method is called groundwood. The advantages of groundwood pulp are low cost, high yield, high bulk and opacity.

Thermo-Mechanical

The wood used in this method of papermaking may be debarked. Heat and water are used to wash the fibre as it is ground into pulp. This pulp is commonly employed to produce paper used in the production of magazines such as People, Time and Newsweek. Paper made in this manner has high yield and high opacity.

Chemical

The wood in this pulping method is debarked, chipped and screened to remove knotholes and flaws. It is then “cooked” with chemicals to remove the lignin. It is the removal of lignin and other resins that help produce the bright white pulp that is necessary for fine papermaking. Pulp produced using this method is called woodfree.

NOTE: Groundwood refers to pulp with impurities, like lignin, remaining. This differs from wood-free pulp, which has had impurities removed.

FOREST CERTIFICATION PROGRAMS

Forest certification is an assurance given to a purchaser of wood and paper products that the timber used for the product originates from well managed forests. This means the forest is managed in an environmentally, socially and economically sustainable manner.

Printing on forest certified paper provides a means to actively support well managed forests and communicate a company's corporate social responsibility program.

Sustainable forestry is about:

· The balance between society's increasing demands for forest products and the preservation of forest health and diversity.

· Maintaining forest biodiversity.

· Ensuring regeneration capacity.

· Not causing damage to other ecosystems.

All certification programs require:

·Certified fibre supply - from certified forests that have been independently audited to the requirements of a forest certification standard.

·Chain of Custody - tracks the certified fibre from the forest to the end user through all of the stages of transportation and transformation. The main purpose of chain of custody is to keep bad practice foresters out of the supply chain.

FSCR - Forest Stewardship CouncilR

The Forest Stewardship Council is an international non-profit organization founded in 1993 to support environmentally appropriate, socially beneficial, and economically viable management

of the world's forests. It supports the development of national and regional standards to be used to evaluate whether a forest is being well managed. Membership is open to all who are involved in forestry or forest products and share its aims and objectives. Headquartered in Bonn, Germany, FSCR is governed by an elected Board that consists of people from industry, environmental, social and labour groups, Indigenous People's representatives and others. The Forest Stewardship Council accredits other organizations to carry out independent inspections and issue Forest Management and Chain of Custody certifications. The FSCR goes a step beyond just sustainable growth, incorporating elements of social interest, economic viability and indigenous claims. www.fsccanada.org.

FSCR is the most recognized forest certification program in Canada. Other forest certification schemes include:

·Sustainable Forestry Initiative (SFI) www.sfiprogram.org

·Program for the Endorsement of Forest Certification Schemes (PEFC) www.pefc.org.

RECYCLED PAPER DEFINITIONS

Recycled

A recycled paper is, by definition, going to contain some kind of waste product. There are three basic types, and it's their proportions that will determine a paper's environmental credentials.

•Post-Consumer Waste - Paper that has completed its life cycle to the end user, then re-enters the production process through recycling bin collection.

•Pre-Consumer Waste - Includes manufacturing waste from envelope converters, binderies, and printed paper that never reached the consumer.

•Mill Waste - Waste that is collected from paper mills and reintroduced into the paper making process. Like pre-consumer waste, mill waste has always been recycled.

Recyclable

This term simply means that the product is able to be recycled; it does not mean that the product contains any amount of recycled content.

Recycling Symbols

The most recognizable of all the recycling symbols, the Mobius Loop, belongs to no particular government or official body. To use the mobius loop (the three arrow symbol), a paper must contain recovered materials. The amount may vary considerably, from small percentages of pre consumer waste to 100% post consumer waste. The amount of post consumer waste should be noted in an accompanying tagline.

This symbol is used to show that a product or package is recyclable. It is best to qualify these symbols with a statement such as "recyclable where facilities exist" so the viewer knows what they are referring to.

BLEACHING PROCESS DEFINITIONS

When wood is pulped, it is naturally discoloured. The environmental challenge is to bleach the pulp white while minimizing harmful side effects on the environment.

Elemental Chlorine Free (ECF)

Pulp is bleached using processes that do not use elemental chlorine gas, significantly reducing the amount of toxins released.

Totally Chlorine Free (TCF)

A pulp bleaching process that avoids the use of all chlorine, in elemental or compound form.

Processed Chlorine Free (PCF)

Recycled fibers are bleached using this process which is chlorine free. The pulp cannot be called totally chlorine free since the recycled fibres could have been chlorine bleached in their initial

use.

PAPERMAKING

Modern papermaking blends fibre, chemicals and water to achieve desired properties, both aesthetic and practical.

A paper machine is the mechanized equivalent of a papermaker dipping a wire screen on a wooden frame into a small vat of fibres suspended in water. The papermaker shakes the screen back and forth, draining off more and more water until a sheet of paper fibre forms. The web of pulp is laid between layers of felt to absorb the excess moisture. Modern papermaking goes through the same basic steps but on a much larger scale.

Cellulose wood fibre, chemicals and water are mixed. A blend of hardwood and softwood is used. Hardwood fibres are important for the paper’ s formation and surface smoothness, while softwood fibres impart strength. This mixture is called the furnish or slurry.

·The wet end (known as the paper forming section) is where the pulp mixture is released onto the wire.

· The dry end (which consists of both the press section and the dryer section) is where water is removed by pressing the wet paper between rollers and felts to reduce the moisture content to the desired level.

As the mixture of pulp, water and fillers flows under the slice and onto the wire, it is 99.5% water and only 0.5% pulp. The wire (actually a synthetic mesh called the fourdrinier wire) is responsible for some characteristics in the formation of the paper. The wire section gently shakes back and forth to help eliminate water and form the grain direction. The paper grain runs the direction of the movement of the fourdrinier wire. At the end of the wire a dandy roll is used to impart a pattern into the paper.

When paper comes off the machine, the roll is grain long. Long grain and short grain indicate whether the paper grain – the primary direction in which the fibres are aligned – runs parallel to the long dimension of the sheet or the short dimension. Grain direction is indicated in swatchbooks and on product labels as the second dimension of a sheet measurement, or by underscoring, or both (i.e. 25 x 38). You can easily determine the grain direction of a sheet of paper by folding it. The fold is smoother with the grain; the rougher fold (from broken fibres) is against the grain. Paper is stronger in its grain direction and printers usually prefer to print grain long. Folding is also better with the grain and can be improved by scoring. Scoring creates a crease that bends the fibres rather than breaking them.

Another attribute of paper affected during the papermaking process is formation. Consistent formation means that the fibres are aligned and evenly dispersed in the paper. Poor formation can be seen in a sheet if, when held up to the light, it appears cloudy with clumps of fibre. Alternately, limited clouds and a more even distribution of pulp are signals of good formation which increases the paper’ s printability – it will absorb ink and reflect light evenly.

The press section is where the web of partially formed paper leaves the wire and is transferred to a felt belt that carries it into the dryer section of the machine. The top side of the paper comes into contact with a top felt, which today is synthetic for consistency and longevity. This is referred to as the paper’ s felt side, opposite of the wire side, which is the bottom side that runs along the machine wire in the wet section. The web of paper is pressed between heavy rollers to expel water and compress the fibre. Machine felts then carry the web to the dryer section.

In the dryer section, the web of paper threads through a long series of steam-heated drying rolls. Surface contact with the hot dryer cylinders removes additional moisture from the paper. Towards the end of the dryer section, some papers are dipped in a starch bath that binds the

surface fibres to prevent picking on press, and conditions the surface to be less absorbent, improving ink holdout. This section of the paper machine is called the size press. After the size press, the paper runs through an additional series of drying rolls, and it may pass through a calender stack before it is wound onto the master roll. The paper passes between calender rolls (called a calender stack) that impart various finishes to the surface. Little or no calendering produces a vellum finish. Heavy calendering will create a very smooth hard surface on the paper, reducing the caliper.

In finishing, the master roll is rewound and slit into smaller rolls for web printing, or slit and sheeted for flat sheet printing. The sheets are cut to various sizes, packaged and shipped to merchants.

BOND AND WRITING PAPERS

Bond and writing papers are used for stationery and have matching envelopes and card stock to create a complete identity package. They may be watermarked for prestige and security. They are available in several finishes and may contain cotton.

WATERMARKS

A watermark is a logo or signature mark that is subtly visible at first glance, but slightly more prominent when the paper is held to the light or placed on a flat surface. The watermark is embedded into the paper structure itself, pressed in by a roller mounted die called a dandy roll, during the papermaking process, while the fibres are still wet. Watermarks are added to writing weights of 24 and 28 lb only.

There are three types of private watermarks:

1. Wire Mark - A fine wire is welded onto the dandy roll. When the raised lettering or image comes in contact with the web of paper, it disperses the fibre, leaving fewer fibres or a lighter area in the paper.

2. Shaded Mark - The wire mesh of the dandy roll is depressed with the image of the desired watermark. When the recessed area of the dandy roll comes in contact with the web of paper, more fibres flow into the area, creating a darker image.

3. Combination - Sometimes both wire and shaded watermarks are used to create an interesting pattern, logo or brand name.

Private Watermark

The dandy roll can be customized as a private mark to ensure security or advertise a corporate name. Having a private watermark is considered a sign of prestige and success. Minimum order for a genuine private watermark is 2000 lbs.

Digital Watermark

Some mills also offer a digital watermarking option with a minimum order of 120 lbs, allowing for short run applications. In this process a rubber plate uses a non alterable solution to transfer the logo, signature mark, or specified image onto the finished paper.

OFFSET AND OPAQUE PAPERS

Offset

A printing paper, coated or uncoated, made for the specific requirements of the offset printing process. Offset printing requires the paper to be strong enough to withstand the stress of offset printing, to have a surface with sufficient sizing to resist moisture and have properly balanced moisture content.

Opaque

A term used to help separate higher quality uncoated opaque papers from standard uncoated offset papers. The opaque papers possess an exceptionally high opacity-to-weight ratio. That is to say, at any given basis weight, a sheet of paper from the opaque category will be more opaque than a standard offset sheet. The more opaque a sheet of paper is, the less

light will show through it. As a result, printing on the back of the sheet or on the following page is less likely to be visible from the front or through the previous page.

Advantages of Opaque Paper Compared to Offset Paper:

· Readers can focus more easily on the information because of better opacity.

· Holds shadows better, and you can use finer line screens for crisper text and sharper images as there is less dot gain.

· Lower dot gain and higher brightness make colours sharper and more vibrant for better ink snap.

· You can use a lighter basis weight and get more sheets per pound, increasing yield.

· Because you can use a lower basis weight due to the higher opacity, there may be an advantage of reduced postage.

Surface Treated

A surface treated sheet has been treated with extra sizing and has been calendered to produce a smoother, closed surface. The paper is recommended when clarity of four-colour reproduction is important.

Vellum

Vellum sheets usually have a toothy finish and bulk higher. It is possible to drop one basis weight and still maintain the same caliper of smooth offsets, thus allowing greater cost savings.

Hi Bulk

Hi Bulk paper is used primarily for return mail applications. This grade meets postal regulations and therefore must caliper to no less than 7 points in thickness. Hi Bulk paper is available in smooth and vellum finish.

TEXT AND COVER PAPERS

Text and cover papers are high quality uncoated papers, offering many creative options with their rich textures and colours. Textures are achieved through a variety of manufacturing processes referred to below.

Advantages of the Text and Cover Category:

- Many creative options
- Textures and colours enhance one colour printing
- Unique
- Immediate tactile response

Watermark or Dandy Roll Finish

Dandy roll finishes are applied at the wet end of the paper machine, when the web of paper is still 95% water. The dandy roll can apply a brand watermark, texture or both. Different patterns are welded onto the dandy roll and, as its raised surface comes into contact with the web of paper, the fibres are dispersed leaving the desired pattern. Papers made with a dandy roll finish are two-sided, and special care is required for crossovers or side-to-side printing. The twosided pattern is more noticeable in some textures than others. The most popular finishes made this way include columns and laid.

True Felt Finish

True felt finish papers are created after the web of paper leaves the wet end of the paper machine and enters the press section where textured felt rollers gently squeeze out excess water. Papers with a true felt finish are made on smaller, slower moving paper machines. The woollen felts are costly and need to be replaced frequently, making these papers more expensive than paper made with a more modern finishing process. True felt paper characteristics include rich textures, deep colours and higher ink absorption. The heavy texture makes these papers well suited to blind embossing and most specialty printing processes. True

felt papers are ideally suited for presentation folders, invitations and annual report covers.

Rubber Roll Embossed

As the web of paper leaves the wet end of the paper machine, it passes through a series of rollers that are covered with textured rubber sleeves imparting a felt-like finish. Rubber roll embossed papers offer good bulk and opacity and are available in text and cover weights. While a true felt finish is achieved through the use of felts to impart a finish, a rubber roll embossed felt paper provides a similar finish at less cost.

Super Smooth Finish

A super smooth finish is created by passing the finished web of paper through calender stacks (a series of highly polished metal rollers). Super smooth papers provide an improved printing surface, are less bulky than papers of the same basis weight and may galvanize with a solid flood of ink. Calendering compresses the paper, creating a very smooth hard surface with excellent ink holdout. Super smooth finished papers are ideally suited for stationery packages, folders, direct mail and business cards.

Off-Machine Embossed

Once a paper is made, it may be embossed by an off-machine embosser. The most common off-machine embossed finish is linen. Other interesting textures made by this method include artbrush, linear and ribbed. Embossing the sheet compresses the fibres and creates a hard surface resulting in good ink holdout and lower caliper. The surface is embossed either between a patterned steel roll and a plain roll (embossed one side), or two patterned steel rolls (embossed two sides).

Double Thick / Duplex

A double thick paper is created by laminating two identical sheets together to create a thicker

stock than what a paper machine can produce. A duplex paper is produced by laminating two different papers together to create a very heavy cover stock. A mill may combine different colours and textures together to create a unique look. These papers are usually heavier and more expensive than traditional cover weights and offer many creative options. Some mills will accommodate custom duplex requests.

COATED PAPER

Coatings seal the surface of the paper and provide a good foundation for ink, allowing it to "sit up" on the surface - this is called ink holdout. Other advantages of coated paper are sharper definition when using finer line screens, improved paper density and greater colour fidelity. Coatings consist primarily of highly refined clay and additives. The exact mixture is determined by the desired shade, brightness and finish. Additives such as calcium carbonate and titanium dioxide provide a bright blue white shade.

Coatings are applied either as a final step in the papermaking process on-machine or, after the paper is made, off-machine. Typically, matte finished grades tend to be on-machine coated. Off machine coating produces a sheet with a more refined surface. Coated paper can have from one to three layers of coating per side.

One of the most important qualities of coated paper is its smoothness. Three key factors impact smoothness: a well formed base sheet, precisely applied coatings, and calendering. Calendering improves ink holdout by polishing the paper's surface. A calender is a stack of hard cylinders rotating against softer cylinders. The paper runs through this stack of rollers to receive its desired gloss. The downside of calendering is that, as the paper is compressed, bulk and opacity are decreased.

There are four paper characteristics that affect print reproduction:

1. Finish–A term used to describe the paper's surface qualities. Coated paper has several

finishes, ranging from the toothiness of a matte coated sheet to the high gloss of a premium coated sheet. Rough surfaces scatter light and the result is softer, less defined detail and colour reproduction. Smooth surfaces, on the other hand, reflect the light evenly. There are a number of factors to consider when selecting a finish. Gloss gives better fidelity with photos, but dull or matte is easy on the eyes. Dull, matte and silk finishes are prone to scuffing and may require a varnish to protect the surface.

2. Porosity – Refers to the amount of ink absorption. The less porous a paper is, the better the ink holdout. Porosity also affects opacity. The more ink that sinks down into the paper, the more show through.

3. Brightness – There are two commonly used scales for measuring the brightness of a sheet of paper, GE and ISO. Each has its own scientific methodology but essentially measures the ability of the sheet to reflect light.

4. Whiteness – Not to be confused with brightness, whiteness is a term used to illustrate the shade of a white sheet. This too can be measured using a scientific scale.

Matte Coated

Matte is the finish that naturally results from applying a coating and letting it dry. Whether onmachine or off-machine coated, mattes usually receive no calendering. Because of this, matte grades have a tactile or “toothy” feel. Low-end matte coated papers have better printing characteristics than most uncoated printing paper, but they are not appropriate for every print job. Projects with large dark solid areas will take on a mottled appearance if a matte is used. Without calendering, matte coated paper may have a tendency to scuff and mark in the bindery or with extensive handling. A varnish coating will have a tendency to soak into a matte coated sheet rather than sit on top of the sheet to give the desired visual contrast.

Matte coated paper attributes:

· Improved printing surface compared to an uncoated sheet

· Increased bulk

· Excellent opacity

Dull / Silk Coated

Dull coated papers are calendered between alternating rolls of sandblasted steel and compressed cotton, creating a low-gloss surface. The amount of texture on the sandblasted cylinders, the number of cylinders, the rotation speed and pressure all affect the finished product.

Dull finishes are the perfect background for printed matter that involve large amounts of information and reproduction of photographic images. A dull surface will take solid ink coverage without the mottle that is commonly seen in matte coated paper. The most common applications are annual reports, art books, and corporate brochures.

Dull, Silk and Satin coated paper attributes:

· Excellent printability

· Non-glare surface

· Enhances varnish treatments

Gloss Coated

Gloss has a highly finished coated surface. After the coating is applied, the paper passes through a large calender stack. The web of paper travels between alternating rolls of polished steel and compressed cotton. Depending on the quality of pulp, coatings, and quality of paper being made, there can be a variation of gloss coated papers, anywhere from a number 5 publication paper to a premium gloss coated paper.

Gloss coated paper attributes:

· Improved print performance

· Durable glossy surface

· Smooth feel

· Variety of quality levels

Premium Gloss Coated

Premium gloss coated paper was originally conceived in Europe in the 1980’s, when demand for extra gloss was high. Gloss coated papers are off-machine coated using a double or triple coating process, and then supercalendered to create a very smooth, uniform, glossy surface. Because the surface is so well sealed, a longer ink-drying time may be necessary. For folding, a broad score with a rounded rule is recommended to prevent cracking.

Premium gloss coated paper attributes:

· Ultimate printing surface

· Excellent print and press performance

·Very glossy surface

Cast Coated

Cast Coated paper is the glossiest looking coated sheet. This look is achieved through the application of a wet coating before contact with a highly polished, heated chrome drum. The wet coating is pressed firmly against the drum for finishing and drying. Upon leaving the pressure of the chrome-plated drum, the paper surface is dry, extremely smooth, and mirror-like in finish. Cast Coated paper has high bulk and ink absorption characteristics. Although the glossiest looking, Cast Coated papers do not have the hard polished surface or the superior ink holdout of a supercalendered sheet.

Cast Coated paper attributes:

· Coated one side or coated two side

· Extremely high gloss shine

· High bulk

Coated Card

Coated Card is an inexpensive cover stock originally used mainly for packaging. It is also used for low budget pocket folders, covers, and more. However, the finish is not as smooth and does not have as high a gloss as a higher quality coated grade. It is available in C1S and C2S, usually in 8 pt, 10 pt, and 12 pt.

BRIGHTNESS AND WHITENESS

Brightness and Whiteness are two paper properties that are often confused. They are not the same; brightness does not equate with whiteness, or the reverse. Brightness is measured with a number and whiteness is a colour or shade.

Brightness

Brightness is the measure of a paper’ s ability to reflect light. The higher the number, the brighter the sheet, which is rated on a scale of zero to one hundred. Brightness is the volume of light reflected off the sheet of paper.

An advantage of a brighter paper is greater contrast between printed and unprinted areas. Brightness also affects the brilliance and snap of printed images. While one paper may be rated brighter than another, it really comes down to personal choice. Most people perceive a bluer white sheet as brighter though it may not measure that way.

Brightness should not be confused with whiteness or shade. Fillers and chemicals are used to increase brightness - they help to give the paper blue white shade but also take a toll on the paper’ s stability and runnability on press. Brighteners can cause yellowing when paper is exposed to light. They can also reduce opacity.

Whiteness

Whiteness refers to the colour or shade of the paper. Using a light bulb analogy, you can have a 75-watt bulb that comes in soft white and true white. The wattage (or brightness) is the same in both bulbs, but the perceived colour (or shade) is markedly different. Whiteness is important because printing inks are transparent and affect how colour is reproduced. The subject matter and colour of a particular project should determine the shade of white to be used.

Whiteness is described as having three shades:

1. Neutral or Balanced White - This shade reproduces all colours equally well and allows for truer colour reproduction. Best for limited edition prints and skin tones.
2. Blue White - This cool shade enhances cooler colours and bright tones and provides increased contrast. Best for “flashy” subjects such as glass, chrome and car catalogues.
3. Warm White - A warm shade emphasizes the warmer colours of the spectrum, such as red and yellow.

SCORING AND FOLDING

Scoring prepares a sheet of paper for folding and is recommended on 100 lb text weight and cover weights to avoid cracking. The sheet is gently creased to create an embossed ridge - fibres are bent rather then broken. The paper is hinged with the score on the inside of the fold so as to minimize paper stretch. This turns the fold into two 90 degree bends rather than an 180 degree fold.

Advantages to Scoring and Folding:

1. Paper folds smoothly with the grain direction and roughens or cracks when folding cross grain.

2. Paper is stiffer in the grain direction.

3. Paper expands or contracts more in the cross grain direction when exposed to moisture change.

4. Coating can crack even more so than paper fibres and therefore coated papers should be properly scored.

PAPER MEASUREMENTS

Basic Sizes

Every paper shown in a price book or mill swatch has a basic size, which was first chosen because they would print and cut to the most popular size of the printed article.

Bond paper is used for letterheads and business forms with the most commonly used size being 8 .” x 11”. This size cuts four out of 17” x 22”, therefore, 17” x 22” is the basic size for bond and writing papers.

Book (coated and uncoated), offset, and text papers have a basic size of 25” x 38”. This size was chosen because the majority of books had a page of 6” x 9”. The signature of 32 pages could be printed on one sheet, back and front, allowing for trim after being printed, with little waste.

Cover papers require a little extra paper to cover the spine and be slightly larger to protect the inside pages. As well, the press runs are usually shorter. Twice the book size, plus one inch on each side, allows for 20” x 26”, the basic size for cover paper.

Standard Sizes

If printers were to use only basic sizes, the paper merchant’s inventory would be relatively simple. Different sizes of printed pieces, together with various press dimensions, make it necessary for stocks to be readily available in a large range of sizes. 8 .” x 11” sheets cut with

less waste from 23” x 35” than from 25” x 38”. A business may want a form 6” x 9” which cuts
with less waste from 19” x 24” than from 17” x 22”. Presses may take a sheet 35” x 45” so
that 8 .” x 11” may be run 16 up, making the run half as long as a run using paper 23” x 35”.

Basis Weight

The weight of paper is calculated by weighing 500 sheets (one ream) of a basic sheet size.
Each grade category of paper has its own basic sheet size used to calculate basis weight. For
clarity we have chosen to look at the most common grades of paper and their basis weights.

Writing and Bond Paper 1 Ream (500 sheets) of 17” x 22”
Book,Text and Offset Paper 1 Ream (500 sheets) of 25” x 38”
Cover Paper 1 Ream (500 sheets) of 20” x 26”

Regardless of what size the paper is cut to, the basis weight always refers to the weight of 500

sheets of the basic sheet size.

The most common weights for these papers are

・Writing and Bond paper - 20 lb, 24 lb and 28 lb.

・Book,Text and Offset paper - 50 lb, 60 lb, 70 lb, 80 lb and 100 lb.

・Cover paper - 65 lb, 80 lb, 100 lb, 120 lb and 130 lb.

Writing and Text Equivalencies

Writing weight paper has a basic size of 17” x 22” for calculating basis

weight. Often, the expression “24 lb writing” is used interchangeably with

“60 lb text” (see table on right for more equivalencies). This change in basis

weight reflects a change in basic size (from writing 17” x 22” to text 25”

x 38”) and not a physical change in weight. The sheets remain identical,

except for the size.

Caliper

The thickness of paper is measured by a caliper or micrometer. The caliper reading is described in terms of points with each point representing thousandths of an inch (.001 of an inch), and is expressed as, for example, 7 pt. (or .007 of an inch).

The caliper of paper is important for publications and mailings. Caliper will affect the thickness of a book for publishers, affecting packaging and mailing costs. Mailers such as business reply cards or postcards must meet minimum standards (7 pt. Canada Post, 7 pt. US Mail).

Not all paper with the same basis weight will caliper the same: an 80 lb. coated cover stock may caliper .0075 (7.5 pt.) and an 80 lb. uncoated cover may caliper .012 (12 pt). Papers are either made to caliper or basis weight, never both.

M Weight

M Weight measurement is based on what 1,000 sheets of paper weighs. A lift of 1,000 sheets of a chosen size (e.g., 8.5” x 11”, 23” x 35”, 25” x 38”) is weighed for the M Weight. The weight of any shipment is easily calculated by simply multiplying the number of 1000’s of sheets by the M Weight. For instance, 100 x 10M = 1,000 lb. Therefore, 100,000 sheets of a 10M paper would weigh 1,000 lbs.

W	T
20 lb	= 50 lb
24 lb	= 60 lb
28 lb	= 70 lb
32 lb	= 80 lb

Metric Paper Measurement

This paper measurement is common to much of the world outside of North America. Metric measurement is done using a single sheet of paper measuring 1 metre by 1 metre and a metric weight scale. The single sheet is placed on the scale and the reading reflects grams per square meter (g/m2).

Basis Weight (lbs) Metric (grams/sq meter)

20 lb Bond/50 lb Offset 75 gsm

24 lb Bond/60 lb Offset 90 gsm

80 lb Offset 117 gsm

65 lb Cover 176 gsm

80 lb Cover 218 gsm

100 lb Cover 271 gsm

120 lb Cover 312 gsm

PAPER APPLICATIONS

Paper may be defined in terms of its uses. Each grade serves a purpose, usually suggested by its name. Here are some of the most commonly used papers in the printing industry. The size shown in parenthesis is the basic sheet size (parent sheet size) for that grade.

Copy/Bond Paper (17” x 22”)

The most common basis weight of copy paper is 20 lb. Available in a wide variety of colours and brightness levels, this multi-purpose paper is ideally suited for most office applications and is sometimes referred to as bond.

Offset Paper (25” x 38”)

Most common basis weights are 50 lb, 60 lb and 70 lb for this uncoated paper, though it is

often available in up to 100 lb. Usually these papers are white and are ideal for one colour printing such as large manuals. Sizing is applied to seal the surface of the sheet to help resist picking, add water resistance on-press and improve printability. The term offset is sometimes used synonymously with “book” which is a general term for coated and uncoated papers.

Opaque Paper (25” x 38”)

Most common weights are 60 lb, 70 lb, 80 lb and 100 lb text and matching covers. Opaques are similar to offsets but have unique characteristics that improve opacity and printability. The same basis weights as offset paper are offered. They have a slightly higher cost due to pulp additives, which provide the extra brightness and opacity. Often used for newsletters, manuals and flyers.

Writing/Bond Paper (17” x 22”)

Most common basis weight is 24 lb. Writing sheets are usually watermarked and may contain cotton. These correspondence papers are ideal for stationery, resumes, proposals, etc. Many are laser guaranteed. Available in whites and light colours. Finishes include laid, wove, linen, smooth and vellum among others. Bond and writing papers are usually available with matching envelopes and cover stock for identity packages.

Text Paper (25” x 38”)

Most common basis weights are 70 lb, 80 lb and occasionally 100 lb. These papers are heavier than bond papers and do not have a brand watermark. Text papers are available in a wide variety of uncoated textures and colours and usually have a matching cover. They are ideally suited for annual reports, direct mail and newsletters.

Cover Paper (20” x 26”)

These heavier papers come in a wide assortment of weights from 65 lb to 165 lb (much heavier than a bond or text paper). Most common uses include business cards, presentation folders, menu covers, tent cards, invitations and annual report covers. Uncoated cover papers are available in a wide selection of colours and textures. Lighter colours will often have

matching writing/bond, text and envelopes.

Double Thick Cover (20” x 26”)

A DTC (double thick cover) is created by laminating two identical sheets together to produce a thick cover. Most common weights are 120 lb, 130 lb and 160 lb.

Duplex Cover (20” x 26”)

A duplex cover is created by laminating or pasting two different sheets together, with a different colour or texture on each side. Most common basis weights are 88 lb, 120 lb and 130 lb. Duplex papers are priced higher than cover papers due to the increased manufacturing cost. Ideally suited for presentation folders, menu covers and business cards.

Translucent Paper (17” x 22”)

This paper has been manufactured to appear translucent. The two most common processes are chemically treating paper or mechanically processing pulp into smaller particles to create a translucent appearance. Translucent papers are non-porous and require inks which dry by oxidation rather than absorption. Often incorrectly referred to as onion skin or vellum stock (an architectural term). Uses include brochure flyleafs or specialty invitations.

Coated Book Paper (25” x 38”)

The most common basis weights are 80 lb and 100 lb, though weights range from 60 lb to 115 lb. These coated papers are ideal for posters and the inside pages of annual reports, brochures and coffee table books. Coated paper is most often used for 4-colour process and fine line screens; coated covers provide excellent ink holdout and minimal dot gain. Available in gloss, dull, silk, satin and matte finishes. Usually white, but some mills produce an ivory shade.

Coated Cover (20” x 26”)

A wide variety of weights are available from 65 lb to 150 lb. Heavier than book papers, coated covers are primarily used for report and brochure covers, business cards, tent cards and point of purchase signs. Coated covers share the same characteristics as coated book papers

mentioned previously.

Index (22.5” x 35” and 25.5” x 30.5”)

This paper is produced to be an inexpensive, stiff sheet. Its two most notable characteristics are that it is receptive to pen ink and is much less flexible than other papers. Most popular weights are 90 lb and 110 lb smooth finish. Index is commonly used for door-hangers, bookmarks and index cards.

Tag (24” x 36”)

Tag papers are known as utility sheets in the industry. They are generally available in weights ranging from 100 lb to 250 lb. This paper is predominantly white, though some other colours are available, such as manilla, green and red. This stock has high tensile strength, good folding and bending qualities and decent resistance to water and tearing. Tag is commonly used for file folders and shipping tags.

Bristol (22.5” x 28.5”)

Bristol papers have a softer surface than a tag or an index, and score and fold particularly well at high speeds. Bristols are an economical option with uses similar to Index. Bristol is available in smooth or vellum finishes, with calipers from 7.6 pt. to 10 pt. Common uses for bristol include direct mail and greeting cards.

Newsprint (24” x 36”)

Not considered a fine paper, newsprint is obviously most often used for printing newspapers. Weights range from 28 lb to 35 lb with 30 lb being the most common. Newsprint is made from groundwood pulp and contains lignin, which causes the paper to yellow and break down over time.

PRINTING METHODS

Our vast inventory of paper is specifically selected for our customers printing needs: digital

printing, commercial sheetfed printing or web printing. To determine which method of printing will be most suitable, you will need to consider the type of job you're working on, the size of the run, the schedule, the need for customized information and the costs of the appropriate paper. This is where your printer and Spicers Representative can help you.

Digital Printing

One of the fastest growing segments of our market is digital printing. From a home office laser printer to a commercial digital press your paper choice must be considered. Digital printers use dry or liquid toner that will have varying results on the paper you choose. Smooth paper is ideally suited for digital printing with many paper mills offering a digital guarantee. Digital printing is ideally suited for shorter runs; making it possible to have a printed component to any marketing campaign. Many digital presses offer variable data printing (VDP) that allow for personalized communication with different messages, images or addresses for each recipient. Benefits to digital printing include: 4-colour, fast turnaround, short runs and variable data.

Commercial Sheetfed Printing

As the name implies, sheetfed presses print on sheets of paper and have long set the standard for print quality. Sheetfed printing offers the widest selection of paper choices of any printing method. They can accommodate heavier paper stocks, a wider range of textures and finishes and can handle finer screens as well. With as many as 12 colours available and the ability to run sheets through the press twice, it's possible to print virtually any combination of colours, varnishes and coatings. Benefits to commercial sheetfed printing: higher resolutions, more paper choices and finishing options.

Web Printing

Web presses print on paper that is pulled from a long roll which is cut and trimmed to size after printing. With their high speed capabilities of up to 100,000 impressions per hour, web presses are almost always the best choice for printing large quantities, around 50,000 and up

for catalogues, annual reports and other publications. Newspapers are printed on web presses. Paper choices are limited and best left to the printer for specification. Web presses almost always perfect, printing both sides of the sheet in a single pass, so it doubles efficiencies. Benefits to web printing: speed, best for large print runs and economical.

MAKING THE BEST CHOICE

There are many variables when selecting paper for any printing job. Making the right choice can have a significant impact on both the cost and effectiveness of an application. Each job is different; to achieve the best results the following factors should be considered.

Paper Size

The available size of the paper can have a major effect on the price of the paper for a given job. For example, 11" x 17" cuts 4 out of a 23" x 35" sheet and just the same number out of a 25" x 38" sheet. On the other hand, 12" x 12" cuts 6 out of a 25" x 38" or 26" x 40" sheet, but only 2 out of a 23" x 35" sheet.

Custom sheet sizes are available in some grades.

Length of Run

For small runs the paper cost represents a minimal part of the total cost. In these instances a top quality paper adds very little to the final cost. For example, the paper for a long-run print job often accounts for 35% of the total cost. For a short-run job the paper may represent only 6-7% of the total cost.

Complexity of Work

For jobs with extensive foil work, additional special colours, multi-level embossing, etc., the paper again only makes up a small part of the final cost. In these cases a high quality paper can be selected for very little extra cost.

End Use

How the printed job is to be used helps determine paper selection:

· How will it be printed? (sheetfed, digital, web)

· What is the quantity? (cost of paper isn’ t as important in small runs)

· Will it be mailed? (Is there a matching envelope – will the finished piece fit into a standard envelope)

· Will it be used in a laser printer? (laser compatible)

Postage Costs

For printed pieces that will be delivered by mail, the dimensions, as well as the weight, can have a significant impact on postage costs. For example, a non-standard size in first-class mail increases postage costs by 105% compared to standard size first-class letter mail.

Envelope Use

If an envelope is to be used, designing the printed piece to fit in a standard-size envelope can reduce costs and production time. Keep in mind that the envelope can be used as an integrated part of the message. Packaging can really make a difference.

Paper Colour and Texture

Colour and texture have a great impact. Deeply coloured papers can cost as much as 50% more than a lighter shade of the same grade.

Bleed Edges

One or more bleed edges often means a larger sheet size must be used on press.

Effectiveness

Compromises on quality often mean reduced effectiveness. The optimum paper choice is the one that balances cost with effectiveness. Your paper professional is always available to help make that decision.

HOW TO SPECIFY PAPER

Before you specify paper to your printer you have to ask yourself a few questions.

· How many copies are being printed? The quantity that you need will help determine the type of printing you will choose. Digital printing is ideal for short runs, offset printing is great for short to longer runs and web printing is used for very large print runs.

·How is your piece being distributed?

·Is it a direct mail piece?

·Does it meet postal recommendations?

·Do you need matching envelopes? Don't leave envelope decisions until after the piece is printed.

·Do you want to print on coated or uncoated paper? The finish of your paper will affect the cost and printability. Coated papers always cost significantly less than uncoated paper. Uncoated paper comes in a wide variety of colours and textures.

·Does this paper need to go through your client's office equipment? Most paper mills have a guarantee for laser and ink jet printing.

·What is your budget? Choose the best paper for your project and a less expensive option for your printer to quote on.

There are endless kinds of paper to choose from. Your printer will have a selection of mill swatch books for you to look at. Larger design studios and agencies will also have a selection of mill swatches.

Choose the basis weight, colour and finish that are best suited for your project. Check with your printer or your Spicers Representative that the weight, colour and finish, that you specify is available locally.

If your paper selection has to come from the mill it will take approximately 2 weeks for delivery. A minimum of 1 carton is required for mill orders. Make sure your delivery date to

your client will allow for this delay.

The Spicers Resource Centre can supply you with paper samples, printed samples or dummies to help with your paper selection. Samples are used for mock ups and for testing through office equipment.

Give your printer a couple of paper options to quote on, a less expensive option and your preferred choice. You may be pleasantly surprised with how little the difference is. Paper costs generally represent 35% of the total printing bill. Your printer will call Spicers to receive pricing and confirm availability. Once confirmed the stock is delivered to your printer.

ENVELOPES

Commercial

For business and personal correspondence such as letterheads, invoices, statements and stationery. The most common size is No. 10 - 4⅛ x 9.. Available in white wove, natural kraft and premium writing grades.

Catalogue, Open End

Used for mailing catalogues, reports, booklets and magazines. Wide seams and heavy gummed flaps ensure maximum protection under rough handling conditions.

Booklet, Open Side

Ideal for direct mail. Concealed seam lends itself to overall printing on front and back.

Invitation

A more formal open side envelope with a square flap. Used for invitations, greeting cards, and announcements. Offered in white wove and premium text grades. Standard sizes are:

· A2 - 4 ⅜ x 5 . · A6 - 4 . x 6 . · A7 - 5 . x 7 .

Side Seamed

Concealed side seams offer a prestige look to correspondence.

Cross Back

Usually with a commercial flap, seams show as an inverted “V” on the back.

Artline

Often referred to as a security envelope, artline envelopes have a printed pattern inside to prevent show through.

Window

Envelopes with a clear address window.

PAPER TERMS

Acclimatize

Allowing paper to sit long enough for it to adjust to the surrounding relative humidity and temperature in the pressroom. This process provides for optimum performance on press.

Archival Paper

Ph neutral or acid free paper made to resist deterioration. Used for documents that must last.

Basic Size

The size of sheet, measured in inches, that is used to establish the basis weight of a given type of paper.

Basis Weight

Weight, measured in pounds, of a ream (500 sheets) of paper in its basic size (writing 17” x 22”, text 25” x 38”, cover 20” x 26”).

Carbonless Paper

No carbon required – paper coated, either front, back or both sides, with tiny capsules which break and react when pen or pencil tip pressure is applied. The broken CF and CB chemicals react to produce an image. This is done without the need for a separate sheet of carbon between sheets.

Coated Groundwood

Coated paper containing more than 10% groundwood pulp. Used for high volume, short lifespan pieces such as magazines.

CWT

Cost per hundred weight. Refers to the price of a hundred pounds of paper. For instance, if paper costs $100 per CWT, then 150 lbs. of paper would cost $150. CWT pricing can be converted to price per thousand (M) sheets.

Deckle Edge

The untrimmed feathered edge of paper products produced at the edges of the web on the paper machine.

De-inking

In the process of recovering used paper to be made into new paper, the ink is removed by mechanical and chemical means to produce clean fibres. These fibres are subsequently turned into new paper.

Dot Gain

Refers to the percentage of spread of the ink dot before it sets on the sheet. The amount of dot gain can be controlled in pre-press and on the press.

Felt

A soft weave finish applied to text and cover paper.

Felt Side

The top side of the paper formed on a single-wire paper machine.

Fourdrinier

Originally it described the wet end of the early paper machine developed by Louis Robert and financed by Henry and Sealy Fourdrinier. Today, in general terms, it may be used to refer to the entire machine, including the dry end.

Grain Direction

The direction of most of the fibres in a finished sheet of paper. Fibres flow parallel to the path in which the paper travels on the paper machine during manufacture. The second dimension always notes grain direction in a sheet of paper. For example, in a 23" x 35" sheet, the grain of the paper runs along the 35" side. This sheet is grain long.

Humidity

A measurement of the amount of moisture in the air. Because paper has a specific moisture content level, humidity will affect paper properties.

Laid

A pattern of parallel lines giving the paper a horizontal ribbed effect. This pattern is created by the dandy roll at the wet end of the paper machine.

Linen

This pattern is created by metal drums, with the linen pattern on the surface, which compress the paper to impart the pattern. This results in a very hard, dense surface which has excellent ink holdout. The linen pattern on paper mimics the texture of fine linen cloth.

Mottle

Spotty or uneven appearance of paper surface and/or printing, mostly in solid areas.

Pages per inch (ppi)

The number of sheets in a one inch stack of sheets of paper. A term used frequently in book production.

Parchment

A writing text cover grade paper which has a deliberate mottled look to it. Available in a wide range of colours, this paper often gives an impression of being old or antique.

Pressure Sensitive

Paper that is coated on one side with adhesive. This adhesive is activated by removing a liner sheet, then applying the gummed surface with pressure. Usually used in the manufacture of labels and tapes.

Surface Strength

Bonding strength of paper exhibited when tested with a stress that is perpendicular to the surface of the paper.

Swatchbook

Same as a sample book – a grouping of papers usually in bound form that displays the weights, colours, finishes and other particulars of a collection of papers.

Synthetic

A synthetic paper is made from a polyethylene film which may or may not be matte coated. These sheets are resistant to tearing, water and chemicals. A synthetic paper has no grain direction, as it contains no fibre.

Tear Strength

Tear is the amount of energy required to tear paper through a fixed distance after the tear is started.

Tensile Strength

Tensile strength is defined as the maximum force required to break a paper strip of a given width under prescribed laboratory conditions.

Translucent

This paper has been manufactured to appear translucent. Translucent papers are non-porous and require inks which dry by oxidation rather than absorption. Often incorrectly referred to as onion skin or vellum stock (an architectural term). Uses include annual report flyleafs or specialty invitations.

Vellum Paper

Term usually applied to a paper finish similar to eggshell or antique. In the past, the term vellum also used to refer to translucent paper.